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ABSTRACT

This collection of papers on semantics and cohesion is organized into two sections: Meaning and Semantics, and Textual Cohesion. Titles and authors are as follows: "Functional Text Semantics, Idioms, and Variability" (Jan-Ola Ostman); "On the Degree of Motivation in Signs Used in Metaphors Involving Plant Symbolism" (Ralf Norrman); "'Hence'--An Iconoclastic Study on Logic, Language and Argumentation" (Johan Van der Auwera); "Montague Grammar and the Aims of Linguistics and Logic" (Bengt-Olof Qvarnstrom); "Coherence, Pseudo-Coherence, and Non-Coherence" (Nils Erik Enkvist); "An Analysis of Textual Cohesion in a Passage from Maria Gripe's 'Hugo och Josefin'" (Erik Andersson); "Some Aspects of Discourse and Cohesion" (Liisa Korpimies); "Some Observations on Cohesion and Coherence in Simplified Texts" (Liisa Lautamatti); and "Felicity Conditions, Preferred Interpretations, and Disambiguations of Pronominal Reference in Reported Speech" (Nils Erik Enkvist). (MSE)

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MEDDELANDEN FRÅN STIFTELSENS FÖR ÅBO AKADEMI
FORSKNINGSINSTITUT, NR 41

REPORTS ON
TEXT LINGUISTICS

COHESION
AND
SEMANTICS

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ÅBO AKADEMI FOUNDATION

Jan-Ola Östman (ed.),
Reports on Text Linguistics: Semantics and Cohesion.

SEMANTICS AND COHESION

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PREFACE

This is the last in a series of collections of papers on text linguistics which has come about as a direct offspring of the Text Linguistics Research Group at Åbo Akademi.

The Research Group, led by Professor Nils Erik Enkvist, worked under the auspices of the Academy of Finland between September 1974 and August 1977. The members of the Research Group were: Nils Erik Enkvist, Erik Andersson, Auli Hakulinen, Fred Karlsson, Viljo Kohonen, Marianne von Wright, and myself.

Previous volumes have included papers on syntax, word order, stylistics, language teaching, cognitive learning, computer processing of syntactic data, all connected in one way or another with the concepts 'text' and 'text linguistics'.

The present papers focus mainly on two topics which have been of primary interest to some of the members of the Text Linguistics Research Group, semantics and cohesion. The former is a topic of general linguistics which c a n be considered from a text-linguistic point of view, while the latter is by its very nature more specifically text linguistics.

The section on meaning and semantics contains papers on a variety of topics, some of which have not often received attention. By its heterogeneity this section tries to stress the many-foldedness of semantic theory. The articles in the section on textual cohesion are more closely connected with one another, basically because of the more restricted nature of the field itself.

The scope of the previous collections has not been tied down exclusively to papers written by members of the Research Group. In this volume too, a number of contributors are active at other Finnish universities, and at universities outside Finland. This also explains why the contributions reflect different approaches. -- I would here like to thank all those who have contributed to the present volume, for giving the collection a wide perspective on matters connected with semantics and cohesion.

I would like to express my gratitude to the Research Institute of the Åbo Akademi Foundation, and to the Academy of Finland for their financial support, which has made the publication of this volume possible.

Thanks are also due to the Research Institute for including the present volume in its publication series.

Åbo, December 1978

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SECTION I:

MEANING AND

SEMANTICS

The Hatter's remark seemed
to have no meaning in it,
and yet it was certainly
English.

- L. Carroll.

INTRODUCTION:

SOME FUNDAMENTAL QUESTIONS IN SEMANTICS

For the last twenty years or so the field of linguistic semantics has changed quite a lot. Inspired by discoveries in fields such as psychology, biology, sociology, philosophy, logic, semiotics, and communication engineering semanticists have found themselves constantly taking new directions in their research. Any new field or aspect has been evaluated in the light of the insight it can give to linguistic semantics, followed by new directions of research, or a search for such directions. An overview of the present state of the art in semantics would come close to being an overview of all the neighbouring fields of linguistics. It is conspicuous, however, that the 'traditional' questions in semantics are still unsatisfactorily answered. Also, many of these questions have been dressed up -- and perhaps to a certain extent also disguised -- in new terminologies.

New terminologies also reflect the growth of knowledge in the field. However, a linguist cannot, as can a natural scientist to a certain extent, forget about the problems that existed in his field some 50 years ago. The same problems crop up today: it is the perspective from which to view these problems that change, through time, and as a consequence of gained insight in the field. -- On the whole, I think one can say that in recent years the development of semantics has gone hand in hand with (and certainly also inspired) the view that language is basically a means for human every-day communication, a functional phenomenon. As indications of this development, notions like presuppositions, implicatives, pragmatics, speech acts, and illocutions will today be found in most works on semantics.

In the same way as we know quite a lot more about syntax after the introduction of the concepts and ideas of transformational-generative grammar, we constantly learn a lot more about linguistic semantics. The

field of semantics has not, however, seen the light of any far-reaching theory comparable to recent advances in syntax. All through the history of human thought, syntax and semantics have gone different ways. It was not until the end of the 19th century that semantics was included as a part of linguistics. Until then syntax had been the domain for grammarians 'proper' and philologists, whereas philosophers, rhetoricians, and literary critics had dealt with aspects of what we today call linguistic semantics. Naturally, such a division between syntax and semantics in a historical perspective is only theoretically applicable, and exceptions are not hard to find. We can here simply remind ourselves of Plato's view of meaningfulness as a necessary and sufficient condition for grammaticalness.

Also, it seems to me that the more we try -- in the spirit of recent developments in syntax -- to tie down matters having to do with meaning to things akin to logical or arithmetic formulae, the more problems we will have when we encounter metaphors, certain types of modern poetry, connotational values of words as parts of their meanings, etc. -- To be able to include such 'border-line' phenomena in semantics we would indeed have to make our theory of semantics as vague and 'rubbery' as possible. If we can construct a theory with a certain latitude, will it still remain on a sufficiently 'scientific' level? On the other hand, if we exclude from our semantic description everything 'extraordinary', will it still be adequate as a description of meaning in language?

The one problem in semantics that has occupied both linguists and philosophers for centuries is the basic question of w h a t m e a n i n g r e a l l y i s .

Should we describe the relation between content and expression in terms of psychological or biological evidence?; in terms of social influence?; or should we keep to a strictly grammatical explanation? Most theories of meaning have been accused of not capturing the ordinary meaning of meaning. But at the same time there is a host of definitions on what this 'ordinary meaning' is supposed to be. Also, as the linguist obtains more information about the field of semantic research his own view of what this ordinary meaning of meaning is, will change accordingly.

How can we envisage something like a 'grammatical meaning' without recourse to other fields of human behaviour? Is such an aim paradoxical? Is 'meaning' something that is t h e r e , waiting to be unravelled and discovered? Is not meaning an ever-present phenomenon in all social interaction? Can meaning be tied down to simple algorithmic figures without taking into account both the psychology of man and his social environment?

Meaning, I think, will continue to be a vague concept in the hands of scientists. And therefore, instead of arguing against particular theories on the basis that they do not deal with the 'proper' or 'ordinary' meaning of meaning, we should welcome any view that contributes to the field, be it controversial or not with respect to existing theories.

Meaning has a social dimension, a psychological dimension, a grammatical dimension, etc., and all dimensions have to be catered for. As linguists we might either stress any one of these dimensions more than the others, or we may want to take a little of each theory and try to make a synthesis of these parts. Also, we should remember that different meaning aspects require different approaches to semantic investigations. -- Whichever method of investigation we choose, our research will contribute in some way to some aspect of the widely diversed 'meaning-complex'.

The difficulty of defining meaning linguistically has its basis in the fact that language itself is so intricately interwoven with other aspects of human behaviour. In the Sapir-Whorf hypothesis of linguistic relativity we even meet the view that it is precisely our language which determines our thoughts and the particular way we view our environment.

Seeing a bird fly, or a man run, we can always ask a surgeon or some other expert to explain to us how muscles are coordinated to achieve a particular goal. Can a surgeon also tell us what language is and how it works by having a look in our brains? Does knowing h o w t o u s e language presuppose that we also should be able to explain w h a t we are doing w h e n we use language? Can we really get t h e answer by locating different aspects of language to different parts of the brain and their respective make-up?

Also, we will inevitably find it almost impossible to give a detailed specification of what exactly a verbal message is, since to do this we would need a highly complicated meta-language which would allow us to talk about our ordinary language in the same way as our ordinary language functions as a 'meta-language' when we discuss what a certain bit of communication means in some other (e.g. animal, or traffic-light) communication system. In practice, however, it would be quite impossible to develop a linguistically satisfactory meta-language, since such a meta-language would anyway be wholly dependent on our own language.

To turn to another question-complex: how much human behaviour is incidental, and to how much does man give meaning? That is, do we need some kind of performance-competence dichotomy for the decription of meaning? To what extent can something have meaning without it being the speaker's (or

actor's) intention to display this 'meaning'? And to what extent does the actual *use* of words influence their meaning? Even the 'Socratic Approach' favoured the view that the real meaning of expressions was to be found by examining the roles they play in (sound) reasoning, and argumentation. But where, if at all, should we draw the line between semantics and pragmatics?

Recent linguistic research has seen a marked stress on communication, speech, every-day language, and, in more general terms, descriptivity as opposed to normativity. To what extent has this stress influenced semantic theorizing? To what extent can we abstract underlying 'propositions' from spoken communication? Is speech only a matter of performance, or is it qualitatively different from written and more argumentative prose? To what extent do spoken and written language follow the same norms, i.e. should their underlying linguistic rules look the same?

In the philosophy of language *propositions* are said to be meaningful, whereas *words* only have meaning. In what sense, then, does a word 'have meaning'? What is the relative semantic importance of the sense and reference of a lexical item? To what extent do dictionary-entries cope with meaning in language? Despite much insistence on the part of present-day linguistics, it has not managed to prove traditional dictionaries inadequate. *As dictionaries* they quite satisfactorily fulfil their tasks. It is also significant that traditional dictionaries often enough *do* succeed in transmitting the 'meaning' of a word by supplying a 'mess' of various information.

It is, however, precisely this often redundant mess of information that is of utmost importance for capturing the meaning of a word. When we ask for a word's meaning, what in actual fact we are asking for are those *implicit* 'rules' that underlie the *use* of the word in a situation.

The part that redundancy plays for meaning needs to be worked out more in detail. And, as for redundancy in an actual text, or context: to what extent does a non-redundant utterance (if there is such a thing) have the same meaning as one filled with every-day language redundancy?

A theory that wants to capture meaning in language needs, I feel, to include more than a formalized theory of dictionary writing.

– *Ed.*

FUNCTIONAL TEXT SEMANTICS, IDIOMS, AND VARIABILITY

by

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A recurring subject in linguistics is the treatment of idiomatic expressions. In this paper I want to outline a functional theory of semantics, and account for idioms and rigid collocations within this general theory. Another concern arising in the paper will be that of linguistic variability and indeterminacy.

It is a very preliminary sketch, and purports to be suggestive rather than a full-fledged, detailed scheme. The approach is eclectic, and though the main interest is in the area of semantics, what emerges is in effect an alternate framework for the analysis of language.[1]

---

[1] I would like to thank the staff at the Dept of Linguistic Science at the University of Reading; and the members of Prof. N.E. Enkvist's Text Linguistics Research Group at Åbo Akademi for invaluable discussions on topics related to semantic and other matters, and for providing me with a most healthy linguistic atmosphere.

I would here also like to express my gratitude to Prof. H.W. Donner for making my stay at Reading (1975-76) financially possible.

Thanks are also due to the Svenska Kulturfonden for Grant 26/76.

This article is a summary of the ideas laid down in my pro-gradu thesis (Åbo Akademi 1976), and a revised version of a paper given at the First Conference of the Linguistic Association of Finland (Lammi, September, 1977). Earlier versions of this particular paper have been commented on by Nils Erik Enkvist, Fred Karlsson, Geoffrey Phillips, and Erik Andersson. I am most grateful for their criticism and suggestions. They do, of course, not necessarily share any of the views expressed in the article.

10 Semantics

1. Language and linguistics

It is often stressed that language as we see or hear it around us every day far from makes up a rigid system. However, this non-rigidity, or variability, is manifested not only in the variety in what has been called a speaker's p e r f o r m a n c e, but can -- as we shall see later -- be found also in what is usually regarded as his c o m p e t e n c e of a language. One way of trying to account for variablity in language in a linguistic theory is to impose other types of rules over and above strict competence rules. And many scholars no doubt hope that one day we will be able to work out a system that makes all aspects of language predictable. The approach in the present article will be of a slightly different kind, however.

Language is a social phenomenon, and linguistics ultimately therefore a social science. As a social phenomenon language would be described in terms of rules which differ from the laws, or regularities, that characterize most (though not all) natural sciences. Linguistic rules aim at reflecting the norms on which a language system, or language systems are built, and which make possible the use of language for everyday communication.

If we accept such a difference in kind between the r u l e s constituting the typical social sciences on the one hand, and the l a w s of typical natural sciences on the other, then the next step is to decide what kind of theory is needed to describe either of them. The ideal theory of any branch of science is one that will account as accurately as possible for all the facts in the respective subject matter. And this, of course, is also what most theories -- at some stage -- claim to achieve.

During the last decade or so, transformational-generative grammar has been extensively criticized by scholars who would like an appropriate linguistic theory to cover not merely the means by which we communicate as human beings, but also our use of language in concrete communicative situations. That is, it is argued that a linguistic theory should not merely be structural (i.e., a theory that purpots to impose a structure on, or reproduce the structure of, language -- for instance as a network of relations), but that it should also (or, rather) be a functional theory (pertaining to reproduce the function of language). With a few exceptions, however, such a plea for a functional theory has usually not advanced beyond

the programmatic stage.

In linguistics a distinction needs to be maintained between the subject matter, language, as a natural, social phenomenon, and linguistic systems as theories about language, constructed by linguists. At the level of theory construction this means that we have to keep apart atheoretical statements and theoretical rules (cf. Itkonen 1974).

As a human construct a linguistic system may be computable, and thus well-defined (in the sense of Hockett 1968). Linguistic systems become well-defined by stipulating rigorous rules and having all the words in a language make up a closed lexicon. -- Language as the subject matter of the social science of linguistics, however, would be ill-defined since it does not necessarily make use of these rules. The linguistic rules can be broken.

The Humboldtian and Chomskyan infinite-use-of-finite-means principle is applicable only in the area of linguistic theory, or rather, to the sub-area of competence within it. (This of course raises the question as to whether performance is to be taken as a part of linguistic theory, or whether it is merely to comprise the factors that have been idealized away when constructing the theory.) The linguistic, theoretical rules constitute the finite means, the algorithm, which enables us to compute the infinite use. In this sense linguistic theories are well-defined. (It is another matter that this linguistic system produces material that constitute an infinite set. According to Hockett (1968:48) "the test for infinitude or finiteness of a set c a n n o t b e a p p l i e d in the absence of well-definition".)

2. Form and function

Let us begin by accepting the general view that, theoretically speaking, language is made up of a f o r m and a f u n c t i o n, and from the point of view of the theory which follows keep these aspects of language apart. Indeed, these two aspects of language are not necessarily characteristic of language per se, but as concepts they are helpful when describing language. Needless to say, the border between what is definitely a matter of form as opposed to function will to a certain extent be ill-defined or shady.

It is then possible to superimpose a form-function dichotomy on the traditional distinction between expression (signifiant) and content (signifié):

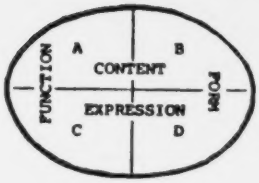


Figure 1.

In Figure 1, B stands for 'formal content': phenomena in the universe which are given labels with linguistic signs, and which these signs in themselves abstract from the outside world. -- D is the linguistic sign itself, e.g. a syntactically defined morpheme or clause. And the relationship between B and D is that of reference (in a broad sense).

A is the 'functional content', which includes the interrelationships, such as causality connections, between extralinguistic phenomena. C is the 'functional expression', which consists of communicatively relevant language-functional elements in language.

In this framework then, a linguistic description of f o r m would be a picture of the means we have to use when and if we want to communicate verbally. The aspect of f u n c t i o n is an abstraction of the use to which we put utterances in contexts-of-situation.

I will not say much about the f o r m , or the s t r u c t u r e , of language, since its characteristics have been worked out in some detail by different linguistic 'schools' like transformational-generative grammar, systemics, tagmemics, and stratificational grammar, to mention just the best known. In their details these theories seem to vary quite extensively, but since the subject matter, language, is their common object of investigation, they must all claim to be able to account for it. To the extent that they satisfy this requirement the basic differences between them must be largely terminological. The interpretive school of transformational-generative grammar -- in the spirit of linguistic structuralism -- deliberately treats language as a pattern of f o r m without letting the situational setting of an utterance or a sentence influence the object of study. Systemics, tagmemics, and the stratificational approach, on the other hand, see language as a hierarchy (of levels, or strata), which go from phonetics through phonemics, syntax, and semantics, and end up in some way or other touching the outside world. In this way then, these theories try to account

for language as part of, and functioning in, a communicative situation. -- Within the transformational-generative approach the recent emphasis on presuppositions and performatives can in a sense be seen as a trick to bring function into form.

Briefly, and without in this presentation touching too much on details as to whether e.g. V, or T, or S (or what have you) is to be regarded as the 'initial symbol' of the syntactic rules, this is how I see the aspect of form in language:

The formal-expression part of linguistics, D in Fig. 1., is an abstraction of the potentialities of language and consists of two closely interrelated 'parts': phonology, and morpho-syntax.

The morpho-syntactic part of linguistics forms a hierarchy of different sized units of language with morphemes as the smallest units, and 'rising' in the hierarchy we would find morpheme-complexes, clauses, and clause-complexes.[2] The relation between morphemes/morpheme-complexes and clause is that of the latter 'consisting-of' the former. The morpheme-complexes and clauses (which can be rank-shifted into morpheme-complexes) are concatenated outputs of a finite set of (recursive) rules, and the output is infinite in the Chomskyan sense.

In an interdependently parallel manner to this morpho-syntactic hierarchy runs the phonological hierarchy, with distinctive features as its minimal units. Moving 'upwards' from distinctive features there would be phonetic signs (phonemes), phonetic clusters (syllables), and syllable-complexes. Outside the distinctive features, which should be universal, the most characteristic thing about the phonematic units are the phonological systems that the phonemes of a particular language create. The distinctive features constitute the theoretical substance, the possible choices, whereas the actual choice that a particular language makes from this inventory determines which of these distinctive features are functionally relevant in that language.

Once the characteristic of 'meaning-bearing' has been eliminated from the morphemes (cf. below, section 3.3) the relationship between phonemes and morphemes would have to be re-examined: on strictly formal grounds the 'consist-of' relation between them could perhaps be saved.

---

[2] I prefer to talk about clauses rather than sentences, since a 'sentence' might include several clauses; thus, a clause-complex may be either a 'sentence' or a (longer) paragraph. M o r p h o - s y n - t a c t i c a l l y this is all the information required for categories above the morpheme and morpheme-complex.

These phonological and morpho-syntactic aspects of language as well as the (reference, sense, and denotation) information in the lexicon, constitute what I have referred to as f o r m in language. That is, the means we are forced to use for the purpose of verbal communication.

By the aspect of f u n c t i o n is meant the way we use language in particular situations. Some kind of behavioural information lies behind the output from the 'linguistic faculty' in our minds, and language, as we hear or see it around us every day, is only a reflection of our ideas and intentions in a necessary medium. And what we want to communicate is reflected not merely by the linguistic form, but also in how we use language.

On the basis of the f o r m - f u n c t i o n distinction the 'meaning' aspect of language will have to be divided into two components: on the one hand the lexicon, and on the other, the 'semantico-functional component' of language. By making this distinction s i g n meaning can be separated from f u n c t i o n a l , or semantic meaning. (Firth -- implicitly at least -- made a similar distinction between 'meaning', and 'semantic function', respectively.)

The study of sign meaning is lexicology, and the term s e m a n - t i c s is here retained for functional meaning. Thus, sign meaning is represented in the lexicon, and together with the units and relationships on the phonological and morphological hierarchies constitutes the formal aspect of language. The lexicon supplies bits of language with potential meanings. That is, it gives a word-for-word meaning to a morpho-syntactic clause, by attaching 'labels' on the elements in the morpho-syntactic hierarchy. Furthermore, it functions as a kind of recognition address for the functional, or semantic meaning, which in its turn provides information as to how this morpho-syntactic clause functions in a specific context.

Strictly speaking, it is not quite correct to speak of the lexicon as being part of the f o r m - aspect of language. Rather, the lexicon mediates between the form and the function in constituting the input to both aspects. In this sense then, the lexicon is t h e basic-generative component.

Apart from sense relations of individual items, the lexicon also contains information about common collocations, where possible this information being abstracted as some kind of semantic features. This is, however, only potential information. The actually occurring sequences belong to the domain of f u n c t i o n . The functional actuality will, among other things, show that possible semantic features contained in the lexicon

are only t e n d e n c i e s (cf. Haas 1973) of the functional items.

A sentence like

(1) The boy loves his sister

would be analyzed on the morpho-syntactic hierarchy as consisting of the morphemes the/def.art., boy, love, s/3p.sg.pres., he/..., s/gen., sister. Loves would be a morpheme-complex. And perhaps the+boy, and his+sister could also be analyzed as morpheme-complexes. And, (1) as a whole is a clause. The 'meaning' that can be ascribed to such a morpho-syntactic clause remains on an i n - i s o l a t i o n level, though. All the morphemes in (1) have an entry in the lexicon (which also includes statements about functional words, and affixes, and how they are applicable to most of the other morphemes, or concatenations of morphemes), and in this sense the lexical entries are 'labels' that get attached to the morphemes. With the help of selectional and such like specifications in the lexicon we are then able to give a f o r m - interpretation of (1).

This kind of lexical meaning is often a prerequisite[3] for the functions a sentence can have in a particular situation. And it is in this way that the lexicon functions as a recognition address for the semantic meaning. The semantico-functional component deals with language in terms of meaningfulness. Tentatively, I regard this component as having four interdependent aspects: the context-of-situation, the prosody, the text, and the functeme. In the following I shall briefly consider each of these semantic aspects.

3. Towards a functional theory of semantics

3.1. C o n t e x t - o f - s i t u a t i o n . First, I want to make a theoretical distinction between the context-of-situation, and situational setting, and regard the latter as a matter to a large extent outside linguistics proper. This is not, however, to say that elements in situational settings lack linguistic relevance. The contexts-of-situation are linguistic abstractions of real-life contextual settings, abstractions in the sense of Firth (1950).

Firth considered the following categories and their interrelations as relevant for linguistic work (cf. Firth 1950:182).

(2) A. the relevant features of participants, persons, and roles
B. the verbal action of the participants

---

[3] In the sense that most verbal messages have some sort of syntactic structure.

C. the non-verbal action of the participants
D. the relevant objects
E. the effect of the verbal action

With such a construct Firth wanted to include the social aspects of language in linguistic theory.[4]

The context-of-situation as an abstraction of situational settings as I see it would include

(3) A. a specification of the linguistic frame (cf. Fillmore 1975,1976,1977) in which communication takes place, e.g. a merchandize transaction; and within this frame
B. the relevant participants, and their specific roles; and
C. temporally and spatially relevant objects, including persons as by-standers.

Textual or pragmatic presuppositions will not have to be stated explicitly as presuppositions. Such 'presuppositions' are either to be found overtly somewhere else in the text (and are thus explained as text linguistic phenomena), or they are present as part of the context-of-situation in which a text functions (and thus cease to be presuppositions). On the other hand, lexical presuppositions, e.g. boast as a verb implying 'personal achievement of speaker' (cf. Enkvist 1978), belong to the area of lexicology.

One further point should be stressed. The fact that a relevant context-of-situation is abstracted from the 'real', outside world with its innumerable situations, or situational settings, does not mean that we are restricted to a strictly defined subset of all possible situations. New frames can be created, bringing in new participants or objects, as need arises. What is or is not going to be linguistically relevant need not be decided in advance. That is, we need not decide on an abstract frame in all its details b e f o r e undertaking a specific analysis of a specific linguistic phenomenon or text.

3.2. T e x t a n d p r o s o d y . The other three aspects of the semantico-functional component -- the functeme, the prosody, and the text -- are connected with the actual functioning of language i n abstracted contexts-of-situation. The functeme can be considered a special kind of text, namely, the smallest element in language which has a semantic function: the minimum (verbal) t e x t being a functeme.

The prosodic aspect of language, which shall not be discussed in

[4] For a concrete exemplification of an analysis according to Firth's categories -- with slight modifications -- see Mitchell (1957).

detail here, tries to tie down matters like intonation which are linguistically relevant from a communicative point of view. This would include those things typical of (oral) communication in terms of spatial closeness between speaker and hearer. Intonation, and various functional utterance particles and clitics (cf. Östman 1977, forthc.a, forthc.b, MS) are the most usual realizations of prosody, though e.g. voice quality might also have linguistically relevant functions in this respect. Prosody can also be viewed as an aspect functionally superimposed on the formal aspect of language.

My definition of a text very much overlaps with that of Halliday & Hasan:

> A text is a unit of language in use. It is not a grammatical unit, like a clause or a sentence; and it is not defined by its size. ... A text is not something that is like a sentence, only bigger, it is something that differs from a sentence in kind.
>
> (Halliday & Hasan 1976:1-2)

A text will here be seen as the proper unit for semantic (as opposed to lexical) investigations. The function of a text is only delimited by an abstracted context-of-situation. A text is made up of an illocutionary act (a "speech act"), or illocutionary acts. It is not merely the morpho-syntactic form of a clause that determines its use in a context-of-situation, but -- and especially -- the illocutionary force behind a text or part of a text. Thus, (1) might be taken as a warning if you are about to do some harm to the sister. Firth (cf. above) talked about the e f f e c t of the verbal action as a relevant linguistic category. Though one can of course argue that the function of a text is the meaning it has for a given interpreter, it would perhaps be more to the point to characterize the function of a text in terms of the intentions that the listener/interpreter thinks he can extract as intentions of the speaker.

A text is also influenced by the attitude of the speaker, as well as, of course, the propositional content in terms of actualized functemes. The different aspects of the attitude of the speaker can be seen from Figure 2.

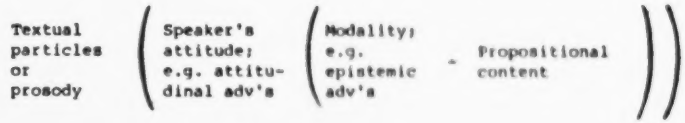


Figure 2.

In Östman (forthc. a, forthc. b) I have dealt with these matters in more detail, especially from the point of view of different functions of attitudinal and modal adverbials, and 'functional utterance particles'.

It can be seen that this approach resembles Bühler's famous triangle for the characterization of the basic aspects of language: the message (= the actuality of the lexicon), the speaker (in particular, his attitudes), and the hearer (more specifically, the effect of the illocutionary force of the speaker's message on the listener):

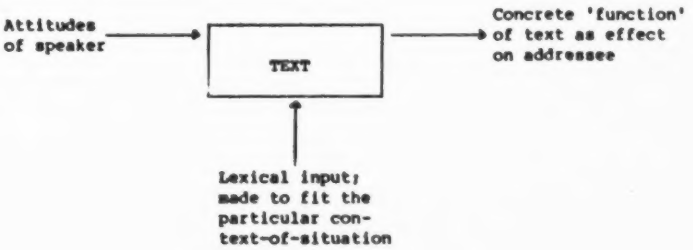

Attitudes of speaker
TEXT
Concrete 'function' of text as effect on addressee
Lexical input; made to fit the particular context-of-situation

Figure 3.

Semantic networks within a systemic framework would provide a theory of how to systematize and abstract different functions of texts. Halliday, as did Firth, stresses the meaning-implies-choice principle. Thus, to be able to state the meanings accessible to a speaker in a particular context-of-situation we need -- according to Halliday -- (a) to state the options available, and (b) to show how these options are systematically related to one another. A semantic network of the systemics type is, however, o p e n - e n d e d in delicacy. That is, "it is always possible to add further specification, but it is never necessary to do so" (Halliday 1972:5).

The real, concrete uses of language which take place in situational settings are to be seen as abstracted into texts, in the same way as the situations themselves are abstracted into contexts-of-situation. This, like all instances of abstraction involves an element of idealization, such that idiolectal and 'connotative' features of texts are, on this theoretical level, left out as non-linguistic matters. On the other hand, a text is influenced (and partly determined) with respect to its function both by paralinguistic and prosodic features of language (as well as -- on a different level, and perhaps to a lesser extent -- by the truth or falsity of what is being communicated).

I do not want to restrict the analysis of the functional aspect of language to one illocutionary act followed by another. I regard as important the larger frameworks of s e t s of illocutionary acts, comprising parts of an interaction, a textual paragraph, or the like. This raises a host of important questions, though. Should, for instance, a paragraph be viewed as always comprising a set of illocutionary acts, or should it perhaps rather be viewed as one illocutionary act? How far could this argument be extended: could a short story, or even a novel be regarded as comprising single illocutionary acts? -- At the other extreme we can (and will) argue that a functeme can be an illocutionary act. But is 'silence' also one? Will it perhaps be necessary to classify different kinds of silences? Should this classification be made on text-linguistic criteria? That, in turn, would involve an element of circularity.

At the textual level of language, variability and indeterminacy are particularly conspicuous. Though we certainly make use of underlying behaviouristic strategies, and try to conform to social norms and tactics, when we create texts, we do so, not according to strict algorithmic rules, but rather according to quite loose (though perhaps statistically determinable) principles. And the same is true when deciding on the particular function and illocutionary force of texts. In other words, we shall have serious difficulty in setting up strict rules to account for and predict any possible output on this level. Recognizing this, many linguists have argued that text grammars simply cannot be written (cf. e.g. Krzeszowski 1975). Such an argument, however, starts off from the wrong end, i.e. from the idea that language really i s a set of algorithmic and clear-cut rules (comparable to natural-science laws), waiting to be unravelled.

3.3. F u n c t e m e , m o r p h e m e , a n d i d i o m . By stipulating a smallest unit like the functeme I want to indicate that the functional aspect of language should not be seen merely as something over and above its formal peculiarities. The functeme is the smallest element in language which has a functional meaning, and in this sense it is comparable to the morpheme on the morpho-syntactic hierarchy, which has a lexical, 'in-isolation' meaning. A functeme can be regarded as a functional lexeme (in the sense of Lyons and others). However, a functeme is not a lexicological unit, it is not to be found, nor to be described in isolation from a particular context-of-situation. A functional definition of the functeme also implies that we need not decide b e f o r e h a n d whether a

combination of elements is one or several functemes.

I want to illustrate the difference between a morpheme and a functeme by considering in some detail the concept of 'idiom'.

What a proper definition of 'idiom' really should sound like has for long been a matter of debate in linguistic discussions. At least in part this controversy stems from neglecting to make the basic distinction between the linguistic aspects of form and function. Similarly, in some versions of structuralist grammar, whether the morpheme really is discoverable without recourse to meaning created uneasiness about the whole concept of 'morpheme'. From the point of view of the neo-Bloomfieldian structuralists the morpheme was originally intended to be a syntactic unit only. But, when it was realized that the unit that had been discovered was also a basic lexical or semantic unit, the morpheme received its dual function of minimal semantic and minimal syntactic unit in language. With idiomatic expressions transformational-generative grammarians have also experienced difficulty, basically -- I would argue -- because they have taken over the structuralists' 'morpheme' concept (with sligh modifications towards more abstractness) under the name of 'formative'.

#

In reviewing the concept of the morpheme in 1958 Hockett also started off with defining morphemes as "the minimum meaningful elements in utterances" (p. 92). In later chapters of his Course, when he is discussing idiomatic expressions, Hockett finds reason to depart from this definition, and suggests the following:

> Let us momentarily use the term "Y" for any grammatical form the meaning of which is not deducible from its structure. Any Y, in any occurrence in which it is not a constituent of a larger Y, is an i d i o m . ... If we are to be consistent in our use of the definition, we are forced also to grant every morpheme idiomatic status, save when it is occurring as a constituent of a larger idiom, since a morpheme has no structure from which its meaning could be deduced. ... we can now assert that any utterance consists wholly of an integral number of idioms. Any composite form which is not itself idiomatic consists of smaller forms which are.
>
> (Hockett 1958:172)

Hockett's decision to include monomorphemic elements among 'idioms' has not -- as far as I know -- met with much sympathy. However, I find that his views here-- apart from being simply a logically necessary further step in his definition -- are defensible from a semantic point of

view.[5] That is, from a s e m a n t i c o - f u n c t i o n a l point of view there is no need for any subcategorization of functemes.

Hockett also seems to be making some kind of distinction between morphemes as forms, and idioms as meanings of these forms. On p. 172-3 he says

> Bear is presumably the same morpheme in women bear children and in I can't bear that pain, but it is different idioms in these two environments.

Householder (1961) tries to develop further Hockett's ideas about the idiom. However, at the outset Householder makes a distinction between 'minimal idioms' and (presumably) other idioms -- without explicitly defining either. He goes on to argue that 'morpheme' is as good a name as any for these 'minimal idioms'. But in making such seemingly innocent renamings Householder blurs the whole issue.

The tagmemicist position, according to which an idiomatic expression is classified as having one specific function in a sentence is especially tenable from my point of view. However, Pike (1967) makes a distinction between morphemes and hypermorphemes on the basis that the latter consist of "two or more specific morphemes" (p. 427). Semantically, however, such a structural division does not seem adequate.

Both Pike and Hockett imply that the morpheme should be seen as having two separate aspects, a morpho-syntactic one, and a semantic one.

Makkai (1972) -- working within a stratificational framework -- objects to Hockett's use of 'idiom', because the term "includes material that really belongs in two separate systems [i.e. strata] , the lexemic and the sememic" (p. 31). Examples of 'idioms' belonging on Makkai's sememic stratum would be too many cooks spoil the broth, to be or not to be, and Hockett's example Now is the time for all good men to come to the aid of the party.

Makkai's objection I suppose is inspired by a wish to retain the structuralistic 'building-block' view of language. But even an approach

[5] However, idioms are not distinguishable from other constructions on syntactic grounds, in the sense that morphemes are distinguished from one another. For example, if the applicability of various syntactic transformations is taken as a criterion for relative idiomaticity, then it is quite impossible (on mere syntactic grounds) to say what is and what is not an idiomatic expression. Rather, we have to set up a gradience hierarchy. Syntactically, an idiom would then be defined as an expression lying 'high' on the idiomatic gradience, i.e. expressions that cannot undergo any (or very few) of a number of relevant transformations.

stressing the structure of language over its function needs little more than a rank-shifting device to handle complex expressions 'functioning-as' subject, object, or what have you. The fact that an 'idiom' (or any other functeme) from a syntactic point of view is a complex construction should not a priori be let to influence our semantic description of (the functional side of) language.

Matthews (1974) makes explicit the distinction between the grammarian's and the semanticist's way of looking at these matters. Thus, in Matthews's terminology *lexeme* stands for monomorphemic words *and* compounds like ice-cream, and Latin liquefacio. For longer expressions Matthews uses the term 'idiom' (or 'idiom lexeme'). But he points out that this is a distinction made on a 'grammatical' basis (Matthews 1974:35),

> We will not say -- as the student of meaning might perhaps prefer us to say -- that 'TRIBUNUS MILITARIS' is itself a single composite Noun.

•

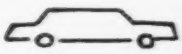
The generally accepted definition of an idiom in all the works referred to above is -- at least implicitly -- that its meaning is not predictable from its parts. As a definition in semantic terms this is tenable, and in my framework idioms are normal instances of functemes. This means that what are generally regarded as 'idioms' should be considered as basically *functional* units in language. All types of word groups with set meanings are particular instances of functeme meaning. The meaning of such expressions should not be considered in isolation. The context in which they occur, and the text or illocutionary act they occur in or as, determine their meanings, as well as whether they are to be taken as set phrases, or as constructions comprising a combination of monomorphemic functemes. The *function* of an expression is the basic criterion for deciding whether it is one or more functemes.

This would mean that kick the bucket is one functeme where the context-of situation allows only the meaning 'die', but that it can be several functemes in a context where objects such as buckets are part of the requisites.

Saying that the smallest semantico-functional unit in language is the functeme, rather than the morpheme, does not neglect nor overlook the *normal* (in terms of frequency) one-to-one correspondence relation between one morpheme on the syntactic hierarchy, and one functeme in the functional 'component'. However, and for instance, what is usually called an idiom corresponds in my framework morpho-syntactically to a

m o r p h e m e - c o m p l e x , and semantically to o n e f u n c - t e m e .

Summing up my own views about the status of the morpheme would amount to saying that it is a semantically neutral unit (cf. also Bazell 1964). The fact that car means, or can be used as referring to something like this



is n o t a language-functional matter per se. I would like to suggest a semantic approach, then, wherein the semantic units, like my functemes, are lexically taken for granted. This means that from a semantic point of view it is not our question to ask w h a t car means, but rather: h o w do we use functeme like car? [6]

Explications of such notions as 'proper meaning of X', 'difference/identity of meaning between X and Y' belong to lexicology, not to the area of functional, syntagmatic semantics. The lexicon is a component of its own, which consists of all the monomorphemic 'words' and affixes in the particular language, for taxonomic reasons classified according to what is normally called selectional or subcategorizational features plus their stylistic and other connotations. These features are not universal in any real sense, though, and the inventory of such features is not necessarily finite.

Furthermore, the information stored in the lexicon mediates between language and reality, and the lexicon is the direct source from which the functional functemes get their input as 'potentialities'.

Thus, the meaning of an idiom is ascertained through a process of lexical rank-shifting, the result of which is the input to one functional functeme. The lexicon itself does not include idioms or phrasal verbs as wholes. But a verb, say, has associated with its lexical entry the information that i f it occurs together with a certain particle, these two elements (the verb and the particle) might t o g e t h e r form the input to one functeme. Similarly, though a construction like kick the bucket is to be seen as a functional functeme in its idiomatic sense, the lexical entries for kick and bucket contain a potential ⟨IDIOM⟩ feature in the lexicon (cf. Figure 4), specifying that when they occur together in a certain compact combination their 'ordinary' lexical meaning has a certain probability to change. The probability itself will or will not be actualized depending on the textual and contextual environments.

[6] Aspects relating to the distinction between 'meaning' and 'use' have of course been discussed in great detail by philosophers.

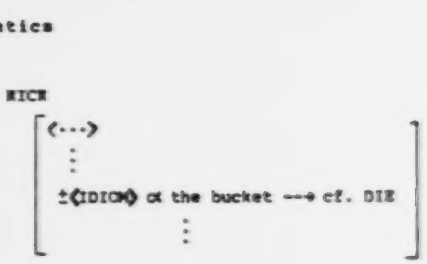


Figure 4.

3.4. T h e r e s u l t i n g p i c t u r e . The model of language that results from what I have said above is presented schematically in Figure 5. As pointed out before, this is a very rough, and very preliminary sketch, and it will no doubt need refinements in most areas.

4. Indeterminacy in language

We can now return to the question of indeterminacy in language. I shall here briefly suggest how this property of language is to be accounted for in a framework of the type I have outlined above.

Historically speaking, the debate about the nature of language variation can be said to go back at least to that between the analogists and the anomalists in ancient Greece. Attempts at constructing ideal languages as early as the 17th century were made precisely to escape the indeterminacy of natural languages. Today the use of mathematical notations and formal logic in the description of natural languages has increased enormously, and many 20th-century linguists even seem to have turned the whole matter upside down, and believe that these idealisations s u f f i c e to describe natural languages. (Cf. Enkvist forthc.) Recently, when the general quest for explicit formulations in linguistic research became everyman's bread, logical formulae for how to describe language most efficiently, most economically, and most explicitly began to flourish. Especially in grammars of the 'categorial' kind, such as Montague grammar, and -- though to a lesser extent -- transformational-generative grammar, the logical formulae as such tended to gain in interest and attract more investigation than every-day, ill-defined, language that such formulae purported to simulate, or even explain.

Naturally, all data is classified in some sense before it is compared to the predictions of a theory (if in no other way, then at least through

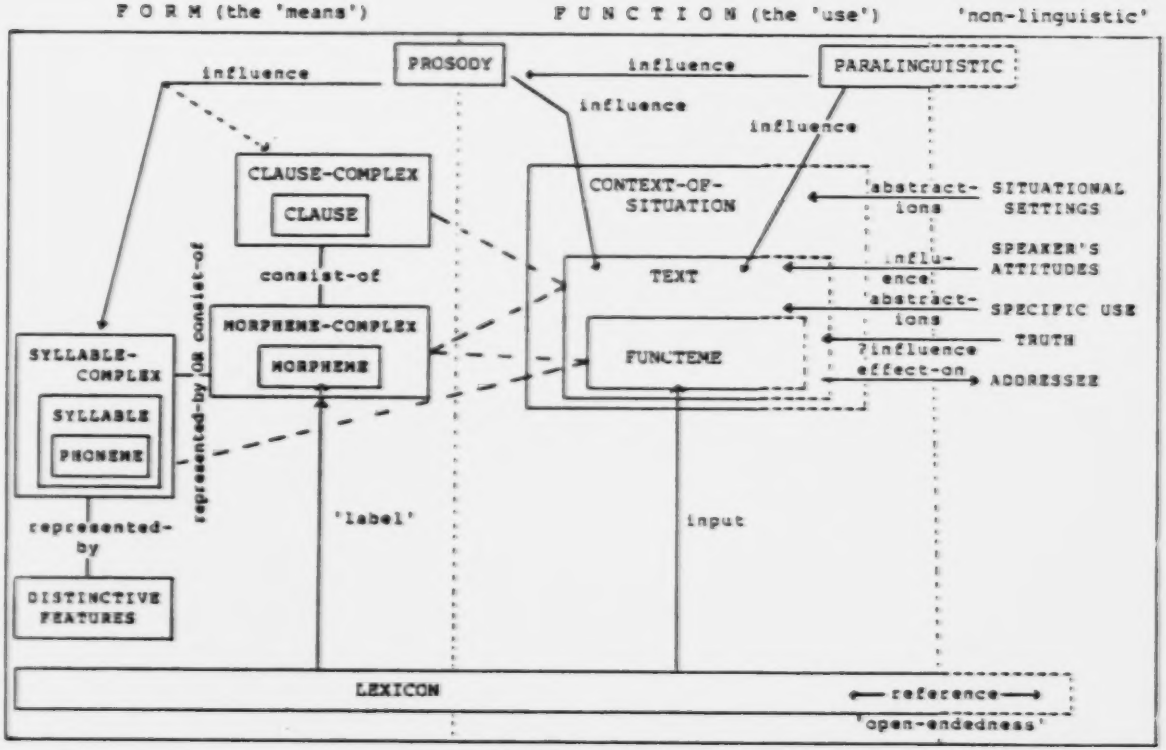

F O R M (the 'means')
F U N C T I O N (the 'use')
'non-linguistic'
PROSODY
PARALINGUISTIC
influence
influence
influence
influence
CLAUSE-COMPLEX
CLAUSE
consist-of
MORPHEME-COMPLEX
MORPHEME
consist-of OR represented-by
SYLLABLE-COMPLEX
SYLLABLE
PHONEME
represented-by
DISTINCTIVE FEATURES
'label'
CONTEXT-OF-SITUATION
TEXT
FUNCTEME
input
'abstract-ions
SITUATIONAL SETTINGS
influ-ence
SPEAKER'S ATTITUDES
'abstract-ions
SPECIFIC USE
?influence
TRUTH
effect-on
ADDRESSEE
LEXICON
reference
'open-endedness'

Figure 5.

human perception), but in some areas this 'preclassification' of data has gone too far. This is the case when a new set of language data gets described not with respect to other parts of natural language, but with respect to already established formulae -- in the manner of descriptions in the natural sciences. Thus, when considering these formulae the previous step from language as 'ill-defined' data to language in terms of a linguistic theory governed by strict rules, gets overlooked.

This view, according to which language is constructed on the basis of rules which are supposed to predict all and only the acceptable sentences of a language, is plausible as a linguistic hypothesis. However, we then find that there are matters in language (as in all social phenomena, and in human behaviour in particular) which cannot be wholly predicted. That is, in concrete situations we do not necessarily have to conform to the rules on which we have built our linguistic description. When testing the hypotheses of our linguistic system against actual language data we might find ourselves in a situation where we either have to admit that linguistic rules can be broken,[7] and/or, we ascribe this fact to variables thus far unknown, and make it our zeal to try to pin down these unknown variables, and thus include them under predictability (or determinism[8]). If we think that our present set of rules is not good enough, we will need other k i n d s of rules to be able to account for language variability.

Language variability can be approached on different levels: we can say with Labov and others that it is the sociological variables that affect the rule system. Thus, we need only stipulate variable, or 'weighted' rules as an appendix to our strict-system rules. Another approach is to say that our linguistic constructs are themselves fuzzy, that they do not have well-defined borders, but shade into one another. This view can be amply exemplified from the syntactic literature: Quirk's gradience, Ross's squishes, Lakoff's fuzzyness arguments, and similar arguments by Bach, all show that the linguist's word-class categories should be seen rather as

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[7] A good example in point is deviant poetry.

[8] As should be clear from what has been said above, I think of determinism in terms of a linguisticalized version of 'physical determinism': all the structures of a language that occur are specifically and exactly, and in all their respects predictable from a definite set of linguistic rules. 'Variability' is in this paper used as a synonym for indeterminacy.

forming a gradience of more or less. (Gradience, of course, is also a linguistic construct.)

These investigators try to pin down variablity in language as a matter of f o r m in the linguistic theory. Of course there is variability in linguistic form, but this variablity should be seen i n r e l a t i o n t o a (specific) linguistic theory, which in turn might, or might not (particularly because of the formal indeterminacy) suffice as a description of language. -- But how then could the variable facts of language themselves be included in our linguistic theories?

First of all, too much stress cannot be given to the importance of language as (a) an instance of social behaviour, and (b) a system which is primarily functional communication. These are two of the prerequisites for understanding why language has to have built into it a certain amount and kind of latitude and non-rigidity. Historical language change and more advanced forms of general and idiolectal creativity arise out of this variability factor, and would not be possible unless language possessed such a factor.

Thus, we have to make a theoretical distinction between indeterminacy in the structure of language, in its form, and the kind of indeterminacy which has come about due to the communicative function of language. In actual fact we can, of course, not separate these aspects (since the latter is probably the cause of the former) but as a theoretical starting point the distinction is probably necessary.[9]

Structural indeterminacy can be found in phonetics and phonology (e.g. different pronunciations of [r] by different speakers of the same language, different initial consonant clusters being used and accepted by different individuals), as well as in morphology, syntax, and the lexicon (e.g. several forms of one case ending being possible, as well as different forms of, say, the imperfect tense). (Hockett's idea seems to be that indeterminacy comes about as a result of conflicting analogies (1968:90-3). But his suggestion to deal with language variablity from the point of view of language as a set of habits or analogies, can only cater for the formal aspects of indeterminacy.)

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[9] From another point of view a distinction between different kinds of variability can be drawn in terms of (a) socially, and stylistically "accepted" variability, and (b) individual variability. One of the main causes for individual variability is then precisely the property of what I call functional indeterminacy in language.

Functional indeterminacy, on the other hand, is to be found on a particular occasion of speaking; it may be seen as a morpho-syntactic construction of which the information in the lexicon cannot alone give an appropriate analysis. In effect, this means that the lexicon also is open-ended and indeterminant. The features and other facts given in the matrices of each lexical entry are merely tendentially governed.

As I mentioned above, functemes are t h e semantico-functional units in language, and they need not be classified beforehand (i.e. before they are used, and function in a certain text), as 'lexemes' would have to be.

Instances of functional indeterminacy are not merely various ambiguous structures, but also such matters as tendencies (cf. Haas 1973), blends (cf. Bolinger 1961), semiproductivity (cf. Bolinger 1961, Dik 1967, Matthews 1971), and similar indeterminant matters discussed e.g. in Palmer (1972).

To take the problem of semiproductivity. Consider Matthews's hierarchy,

(4) a. He cabled that ...
b. ?He radioed that ...
c. ?He memoed that ...
d. ??He messaged that ...
e. *He lettered that ...
f. *He wirelessed that ...

(Matthews 1971:51)

To account for the facts in (4) we would need a more general statement in the lexicon which says that e.g. a Noun can be used as a Verb, a fact which is not as such stated in the matrix of each and every Noun. (General statements are also otherwise needed in the lexicon, e.g. to take care of function words and affixes.) Semi-productivity is thus left as what it is, an ill-defined area in the morpho-syntactic part of our linguistic theory; and moreover, an ill-definition which is due to functional indeterminacy.

The interpretation of a non-productive or semiproductive coinage is usually quite easy. The text in which it functions determines its meaning and use, and the text itself is, as earlier noted, 'open-ended'. However, structures like those in (4) are also indeterminant in the sense that, e.g. (4e) might be more acceptable in one context than in another.

What I mean by indeterminacy as a result of creation-on-the-spot includes idioms, metaphors, the use of propositions with unforeseeable illocutions, fantasy, science fiction, and interpretable and uninterpretable nonsense. Such creations are predictable only statistically, as certain tendencies in language. If they were computable, then language would certainly lose much of its creativity, and it would no more be fit as a

human method for communication, with all that this implies, but rather something akin to a mathematical system.

Finally, a word about metaphors. When we are faced with an utterance of the form Shut that lion's gape!, we first check with the abstracted contextual elements in this particular context-of-situation. When we check the objects we find nothing which corresponds to our lexical entry for lion. Thus, we make a reinterpretation which depends on the particular situation at hand. The word shut presupposes that something is open. What is open in the particular situation? A window? A door? A gate? Somebody's mouth? -- Anyway, even if the morpheme gape occurred without shut, it would still -- in the lexicon -- be noted as something having aperture, and lion's, as an attribute to gape, would imply that the aperture is fairly large in size.

The same kind of analysis can be made for paragraph-long metaphors. These are also determined from the particular situation and interpreted both in terms of dictionary-entry meanings of words, and how these fit into the particular situation.

5. Conclusion

The basic task for linguistic semantics is to relate language to the entities, qualities, and functions in the extralinguistic world. Since this is ultimately also what the whole of linguistics is about, it would seem that to a large extent linguistics i s semantics, and that language i s meaning, in concrete communicative situations. With this as a background I have in the present essay tried to suggest a framework for a more concrete and functional linguistic theory. Suggestions similar to this one have been made decades ago, but they seem to have been overshadowed by a general linguistic tendency to be as formal and rigorous as possible in all areas of language, as in all other sciences; in itself a laudable attempt.

However, this has not only bridged the gap between logic and linguistics; it has also, to a certain extent, blinded some linguists into believing that language is in fact a logical system. Preoccupation with syntax in terms of strict rules soon developed into a further challenge on the part of the linguist: the plea for similar rule-governed principles in semantics, as was thought to have been found in syntax.

The whole issue seems to be an instance of the endless search for observationality and verifiability with respect to language, and rigorous

criteria for one's linguistic research; a preoccupation which also flourished in the days of Bloomfield and the post-Bloomfieldians.

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ON THE DEGREE OF MOTIVATION IN SIGNS USED IN METAPHORS INVOLVING PLANT SYMBOLISM

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1. Arbitrariness in semiotics

When Ferdinand de Saussure presented the principle of the arbitraire du signe in his course of general linguistics, he seems to have thought of the sign primarily in a fairly limited sense. In Part One, "General Principles", Chapter I, where he deals specifically with the nature of the linguistic sign, he gives as the first of his two important principles the arbitrariness of the sign, and begins his exemplification by stating that there is no link of an inner relationship between the idea of 'sister' and the succession of sounds s-ö-r which serves as its signifier in French. According to the notes of most students he then further pointed out that the arbitrariness of linguistic signs is exemplified by the very existence of different languages: 'ox' is b-ö-f on one side of the border and o-k-s on the other. (Cf. Mauro 1972:100.)

At the end of his treatment of the principle of arbitrariness, before proceeding to his second principle (linearity), he anticipates hostile criticism by dealing with two phenomena that might seem to contradict the idea of arbitrariness. Significantly these are onomatopoeia and interjections; thus his concern is again with sounds.

But between the "ox" example and his remarks on onomatopoeia came some reflections which have already caused much confusion among followers and will doubtless cause much more. In Bally's and Sechehaye's reconstruction Saussure's ideas are reported as follows:

> Une remarque en passant: quand la sémiologie sera organisée, elle devra se demander si les modes d'expression qui reposent sur des signes entièrement naturels -- comme la pantomime -- lui reviennent de droit. En supposant qu'elle les accueille, son principal objet n'en sera pas moins l'ensemble des systèmes fondés sur l'arbitraire du signe. En effet tout moyen d'expression reçu dans une société repose en principe sur une habitude collective ou, ce qui revient au même, sur la convention. Les signes de politesse, par exemple, doués souvent d'une certaine expressivité natu[r]elle (qu'on pense au Chinois qui salue son empereur en se prosternant neuf fois jusqu'à terre), n'en sont pas moins fixés par règle; c'est cette règle qui oblige à les employer non leur valeur intrinsèque. On peut donc dire que les signes entièrement arbitraires *réalisent mieux que les autres* l'idéal du procédé sémiologique; c'est pourquoi la langue, le plus complexe et le plus répandu des systèmes d'expression, est aussi le plus caractéristique de tous; en ce sens la linguistique peut devenir le patron général de toute sémiologie, bien que la langue ne soit qu'un système particulier.
>
> On s'est servi du mot symbole pour désigner le signe linguistic, on plus exactement ce que nous appellons le signifiant. Il y a des inconvénients à l'admettre, justement à cause de notre premier principe. Le symbole a pour caractère de n'être jamais tout à fait arbitraire; il n'est pas vide, il y a un rudiment de lien naturel entre le signifiant et le signifié. Le symbole de la justice, la balance, ne pourrait pas être remplacé par n'importe quoi, un char, par exemple.
>
> (Mauro 1972:100-1)

If we try to interpret this passage with the aid of Rudolf Engler's critical edition (Engler 1967:153-5)[1], a number of ideas emerge, though what importance Saussure gave to each of these, and what he meant their relations with each other to be, is not very easy to make out. At least a few points stand out fairly clearly:

- that there are modes of expression based on completely natural signs (pantomime),
- that if the new science of semiology welcomes these, its main concern will still be with the systems based on the arbitrariness of the sign,
- that signs which are wholly arbitrary realize better than others the ideal of the semiological process; therefore linguistics should be the prime example for all branches of semiology,
- also that even if there is a certain natural expressiveness in some signs (such as formulas of politeness) they are nevertheless fixed by rule and it is the rule that counts; nevertheless also, on the other hand, that the term "symbol" should not be used, because a symbol is not arbitrary, it could not be replaced by any other symbol.

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[1] The literature on the arbitraire is voluminous. For a brief survey, see Mauro (1972: 442-9); for further references, see Koerner (1972); also Koerner (1971).

What emerges from a study of the notes in Engler is a picture of some of these ideas as parenthetical and maybe even to some extent tentative and provisional. Saussure asks himself how far semiology could extend its domain ("Où s'arrête la sémiologie? C'est difficile à dire d'avance." Engler 1967: 154), and it seems that at least partly he thinks in terms of reluctantly going down a scale of decreasing arbitrariness. It is clear that Saussure pronounced a value-judgement in favour of arbitrariness, in that he regards the systems based on arbitrary signs as more interesting for the semiologist to study than others. Saussure was wondering about the "cut-off-level" on the scale of decreasing arbitrariness where a system of signs would no longer be very interesting to semiologists.

It is possible that Saussure's value-judgement about arbitrariness versus non-arbitrariness has influenced some recent attempts to determine the exact degree of arbitrariness of signs in certain sign-systems not in the legitimate sense of making investigators more interested in the systems in which signs are more arbitrary, but rather in the misguided sense of making people anxious to prove as high a degree of arbitrariness as possible in any system of signs.[2]

Saussure confidently predicted that the new science of semiology had a right to existence; that its place was assured in advance (Mauro 1972:33). Today, with the rise of such schools as French structuralism, and particularly after the first congress of the International Association for Semiotic Studies held in Milan in 1974, many people think that Saussure's prophesy is coming true.

In the passage from the Cours cited above Saussure, by mentioning them in the same context, linked the question of the extension of the domain of semiotics (as we have now agreed to call semiology) and the question of the arbitrariness or non-arbitrariness of signs; and that link was prophetic too.

It was prophetic because many of the new branches of semiotics proliferating at the moment inevitably sooner or later come up against the question of the arbitrariness of signs. In actual fact some of them come up not only against Saussure -- they may also find it difficult to avoid the

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[2] Another factor also influences these attempts to emphasize arbitrariness. There is a tendency for people always to regard the signs of their own semiotic systems as inherently "natural". Having discovered that this is a fallacy it is tempting to generalize the discovery to a universal theory of semiotic relativity and make arbitrariness a dogma, in the initial enthusiastic desire to share with one's readers the discovery that systems may vary.

physei-thesei debate. The question of the boundaries of φύσις, nature, and νόμος, convention, was debated by the ancient Greeks in connection with language too, as in the Cratylus, and this question has been so basic through the ages that actually it seems possible to view the whole history of linguistics in terms of a pendulum swinging from one extreme on the physei-thesei continuum to the other, as Morton Bloomfield (1973) does in an essay in Daedalus.

The very fact of the continued debate between naturalists and conventionalists could suggest that both are partly right and that language is a mixture of nature and convention. Even so it remains to be determined what is the share of each.

2. Arbitrariness and metaphors

If Saussure's arbitraire is made into a dogma the sense of "linguistic sign" should be strictly limited. One should not, for instance, overemphasize the idea of the arbitraire in a discussion of metaphor. This, however, does seem to happen. In Derek Bickerton's 'Prolegomena to a Linguistic Theory of Metaphor', for instance, the author states quite bluntly:

> Meaning exists, if anywhere, only in the relationship speaker-language-hearer, not in any one of the three, and least of all in any connection between language and the extralinguistic universe.
> (Bickerton 1969:38)

To illustrate this he has just given an example which, like those of Saussure, concerns sound: he points out that le provoca un tinto? means one thing to a Spaniard and another to a Colombian.

It is true that the sound sequence [laiən] for the idea of 'lion' in English is arbitrary. But to proceed from this to the idea that t h e a n i m a l "l i o n" i s c h o s e n a r b i t r a r i l y in the metaphor "the man is a lion" is a very questionable jump, and an unjustified extension of the idea of the arbitraire. Nevertheless it seems as if some such idea did influence Bickerton's argument:

> This connection is subtle enough to have misled some very acute linguists. Bazell, for instance, remarks: "Both green wine and yellow wine are combinations seldom or never to be found. But the reason is different for the former, where it is a question of lacking material motive, and for the latter, where it is a matter of syntactic convention" (1953,83). Now by 'material motive' Bazell presumably means that "there is no green wine in nature", and by 'syntactic convention', that wine which is (at least to speakers of what Whorf

called SAE) optically yellow is habitually modified, across several languages, by the adjective white and its equivalents. But even leaving aside the fact that interpretation of the spectrum is a linguistic variable, this will not do. What of Portuguese vinho verde, or, nearer home, yellow rat (which is not a rat, either) or green fingers? Or take the following table:

iron-mine	*steel-mine
iron ore	*steel ore
ironworks	steelworks
iron magnate	steel magnate
iron production	steel production
iron girder	steel girder
iron determination	*steel determination
iron will	*steel will
iron discipline	*steel discipline

Bazell would presumably account for the non-occurrence of the first two items in the right-hand column, and the occurrence of the next four, by saying that while steel-mines and steel ore do not exist in nature, steelworks, steel magnates etc. do. But if he tried thus to account for the non-occurrence of the last three, he would be unable to account for the occurrence of the last three in the left-hand column. He would be obliged to treat these as metaphors, albeit somewhat moribund ones. But once he had done that, he would have to show why the last three in the right-hand column cannot similarly be treated.

In fact we are better off if we forget about 'nature' and 'material motive' altogether.

(Bickerton 1969:38-9)

I am not sure that we are better off if we forget about nature and material motive altogether. Should a theory of metaphor really ignore the question of the intrinsic suitability of the signs used? Everything that Bickerton says is true enough in a sense; but is it not out of perspective? At least I wish to argue that there are reasons for paying attention also to other aspects of the nature of metaphors than those which Bickerton chooses to concentrate on. Bickerton continues:

The non-occurrence of steel-mines is only accidentally connected with the non-occurrence of steel-mines; yellow rats occurs, though there are no yellow rats. If there were something which might be described as a 'steel-mine', just as there are some persons who might be described as 'yellow rats', steel-mine would occur, even in the absence of steel-mines. The reason why no such thing exists is simply that, in English at least, no specific attribute has been attached to steel.

By 'specific attribute' is meant a particular quality, usually assumed to belong to the denotatum of a sign. Thus to iron, in English, is assigned the attribute 'hardness'. Natural as this may seem, it is in fact a fairly arbitrary process; hardness is only one of the attributes which iron might be supposed to possess (durability, weight, dark colour, etc.) and it possesses it to a lesser extent than many other substances, such as diamond, or, for that matter, steel itself. But to diamond has been attached the attribute 'value', perhaps also 'brightness'.

(Bickerton 1969:39)

Bickerton's argument moves at a level of great specificity. It may be that "steel determination", "steel will" and "steel discipline" are impossible in English and should be starred. But h o w impossible are they? In relation to the communicative need of the person using the metaphor -- who wanted to depict the determination, will and discipline as strong -- they may be impossible in one sense since "iron" is prescribed by convention, but nevertheless "steel" is m o r e possible in the context than e.g. "wax"; the difference being that wax is soft and steel hard.

Bickerton quotes the existence in other languages of a metaphoric use of steel as demonstration of the arbitrariness of the process:

> And the arbitrariness of the process is further demonstrated by the fact that it is not interlingual: hierro has no metaphorical value in Spanish, but acero has; even in loan-translations, iron curtain and iron lung are rendered as telón de acero and pulmón de acero respectively. Spanish simply attributes 'hardness' to steel rather than iron, thus reversing the English relationship.
>
> (Bickerton 1969:39)

But is this not rather a demonstration of the opposite?

That "steel" is possible in metaphors to suggest strength and hardness is indicated by its occurrence in Spanish (and other languages -- there are also languages where both "iron" and "steel" are used metaphorically).

That "steel determination" will come into existence as a metaphor of a strong determination is more likely than that "wax determination" will, simply because steel is harder and stronger than wax.

Bickerton stays within the rules and conventions of present-day English. But it has often been thought that the distinctive feature of metaphors is their capacity to break rules and function as an innovating force in language. And when the boundaries of language are extended with the aid of metaphor, the outstandingly important fact is the interpretability of new metaphors the first time they are used. Their interpretability, (which is closely related to a maximization of their intrinsic appropriateness), is the Darwinistic principle which ensures the survival of the fittest metaphors which man happens to think of.

On the level of great specificity the present state of occurrence of "iron will" and non-occurrence of *steel will is governed by arbitrary convention, but on the level of lesser specificity both the coming into existence of "iron will" in the past, and the probability that as a metaphor of a strong will "steel will" is more likely to come into existence in the future than "wax will", are governed by the non-arbitrary principle of

intrinsic suitability.

It may be desirable not to restrict oneself entirely to a level of very great specificity. As Roger Brown writes in Words and Things:

> The morpheme for hot stands for rage in Hebrew, enthusiasm in Chinese, sexual arousal in Thai and energy in Hausa. However, this disagreement does not suggest the operation of accidental factors since there is an undoubted kinship in the range of meanings. All seem to involve heightened activity and emotional arousal. No case was discovered in which the morpheme for hot named a remote, calm (in fact cool) manner.
>
> (Brown 1958:146)

This was predictable since anyone can see that heat induces speed and movement in nature whereas coldness induces slowness and repose. The predictability of new metaphors is intimately related to their interpretability. Bickerton's essay is synchronic:

> So far we have considered only the synchronic component of a theory of metaphor. Such a theory, however, cannot be merely synchronic, otherwise it could neither account for the history of attribute-assignment (i.e. how countless expressions which must originally have seemed 'metaphorical' have now come to be accepted as virtually or completely 'literal') nor, what is perhaps more important, explain how countless other expressions, which may as yeat not have occurred, may in the future pass through a similar process. For though in the present state of knowledge such a suggestion might seem wildly optimistic, the theory should have -- if future processes prove to be modelled on past ones -- at least some degree of predictive power.
>
> (Bickerton 1969:50)

It seems to me that for a theory of metaphor to have a predictive power it may be necessary to root that predictability in assumptions of the speakers' and listeners' knowledge of nature rather than in their knowledge of language. The metaphor "the man is a lion" can be explained either as natural ("lions are brave") or conventional ("it is agreed that lions should be regarded as brave") but for our skill in predicting, understanding and accepting new metaphors the former is more important.

The traditional view of metaphor stresses the principle of s i m i l a r i t y involved -- the man is similar to the lion in his courage, even though he is different in that he is a man and not a lion. In other words: there exist animals, and differences between these animals (in degrees of bravery, for instance), i.e. there is a system; and also there exist men, and differences between these men; and the metaphor "the man is a lion" means that the position of the man among humans is analogous to that of the lion among animals.

In a paragraph where he challenges the assumption that "the interpretability of texts is mode-of-discourse free" Bickerton writes:

> Everyone accepts that context can affect interpretation. Few realise that we need not go outside language to account for this.
>
> (Bickerton 1969:37)

I am not questioning Bickerton's argument at this specific point, but I am suspicious of the general tendency of theoretical treatises on the metaphor not to "go outside language". Not to go outside may be just as arbitrary as not to go inside from the point of view of an objective inquiry into the function of this type of communication.

3. Plant symbolism: the Cucurbits

In order to see what the function and mechanism of metaphors might look like if you start from the other end, i.e. from nature, I have, in collaboration with Jon Haarberg, undertaken a study in some depth of the symbolic use -- above all the use in metaphor, simile and figurative language -- of one plant family, the Cucurbitaceae. We have collected a number of occurrences from different countries, continents and languages, as well as from different centuries and millennia.

We found that the semiotic role of the cucurbits was highly predictable and that it can be explained almost entirely as resulting from the biology of the plant. Despite a certain range of variation -- and even some seeming contradiction or ambiguity -- at the level of great specificity, the use of the cucurbits in metaphors and similes clustered very thickly round their chief connotations, which are determined by the biology of the plants.

The cucurbits are rich both in positive and negative connotations. This at first seems contradictory but the contradiction results from different attitudes to the same thing, not from differences in perception.

The cucurbits are a typical "record"-species among vegetables; thus they acquire in a heightened form whatever connotations they pick up. They become the epitome of whatever class of concepts they belong to in one or another dimension of their existence. The centrifugal forces at work in the development of cucurbitic meaning are thus strong. Nevertheless the symbolic meanings the cucurbits acquire stay completely within the predictable, which suggests that their physiology is a strong guiding force in the development of their semiotic role.

In this essay it is impossible to present more than a few examples of

the use of cucurbits in metaphors and similes, but even these, I hope, will give an indication of the remarkable consistency of the material.

The cucurbits are symbols of life. Therefore a living, healthy person can be given, metaphorically, a cucurbitic appellation as in Russian огурчик, affect. dim. of огурец, person of ruddy, healthy appearance.

An eclectic, slightly hedonistic attitude to life (and particularly to one of its chief pleasures -- love) can be likened to the arbitrary knife of the melon-vendor who cuts here a slice and there a slice (of the symbol of life), cf. Alemán's Gvzman de Alfarache:[3]

> Soy cuchillo de melonero, ando picando cantillos, mudando hitos; oy aqui, mañana en Francia;

Alemán's metaphor becomes a simile in Mabbe's 1622 translation:[4]

> I am like a Melon-mongers Knife, cutting here a slice and there a slice, now at this corner, then at that, changing and altering my markes, roving sometimes at one, sometimes at another, here to day (as they say) and to morrow in France.

Since the cucurbits are symbols of life they are often antithetically contrasted in literature with a symbol of death. The lily for the Greeks was the flower of death. The proverb "ἢ κολοκύντην ἢ κρίνον" (i.e. either a pumpkin or a lily) is preserved in fragments by the comic poets Diphilus and Menander.[5] Since the lily stands for death, the antonymic symbol, the pumpkin, stands for life.

As the cucurbit is a symbol of life, and blood the vital fluid of humans, the shedding of watermelon-juice is seen as analogous to the shedding of blood, as in the following simile in William Styron's Lie Down in Darkness:[6]

> [the tables] sagged with food, and around them the juice from discarded melon rinds ran like blood in the sand.

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[3] Mateo Alemán, Primera y Segvnda Parte de Gvzman de Alfarache. Madrid, 1661; first published 1599. 250.

[4] The Rogve: or The Life of Guzman de Alfarache. Written in Spanish by Matheo Alemán, Seruant to his Catholicke Maiestie, and borne in Sevill. London: Edward Blount. 1622. Part Second, 59.

[5] A. Meineke, Fragmenta Poetarum Comodiae Novae. Berlin: G. Reimer. 1841. Volume 4, 420; 331.

[6] William Styron, Lie Down in Darkness. London: Hamish Hamilton. 1952. 392.

Cutting a melon means killing it, since the melon is a symbol of life, cf. Edgar Wallace, The Angel of Terror:[7]

> "Jean gets no pleasure out of hurting people any more than you will get out of cutting that cantaloup. It has just got to be cut, and the fact that you are finally destroying the life of the melon doesn't worry you."
>
> "Have cantaloups life?" She paused, knife in hand, eyeing the fruit with a frown. "No, I don't think I want it. So Jean is a murderess at heart?"

The same idea is the basis of a comparison in Stephen Crane's short story "The Blue Hotel":[8]

> There was a great tumult, and then was seen a long blade in the hand of the gambler. It shot forward, and a human body, this citadel of virtue, wisdom, power was pierced as easily as if it had been a melon. The Swede fell with a cry of supreme astonishment.

The two principles of s i m i l a r i t y and d i f f e r e n c e which are co-present in metaphors give rise to a number of variations. In the example from Crane a man and a melon, although they are both examples of life and thus similar; yet, since one is human and the other not they s h o u l d, nevertheless, have been different; but to the knife they were similar after all. In the Wallace-example the idea is that to normal people there is a difference between cutting a melon and cutting human flesh -- even though both are prime examples of life -- but to the cruel woman Jean there is no difference.

In the next example an insurgent captured by the authorities realizes that his body has become only an encumbrance. He decides to confess so as to be executed more quickly:[9]

> Summary justice meanwhile was being dealt in Florence. Jacopo da Diacceto, on being put to the torture, unhesitatingly confessed: 'I wish to rid myself of this pumpkin of a body: we intended to kill the Cardinal.'

His body has become a symbol of useless life. Earlier it was different from a pumpkin, though both were examples of life; now it has become very similar

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[7] Edgar Wallace, The Angel of Terror. London: Pan Books. 1962. 117-8.

[8] The Complete Short Stories & Sketches by Stephen Crane. Ed. and introd. Thomas A. Gullason. Garden City, N.Y.: Doubleday & Co. 1963. 505.

[9] Pasquale Villari, The Life and Times of Niccolo Macciavelli. Trans. Linda Villari. London: T. Fisher Unwin. 1842. Volume 2, 355-6.

and therefore worthless.

These examples of possible variations ended up stressing lack of difference. But other passages in literature may underline mainly the difference:[10]

> 'If that ben't particular,' replied he, 'Squire Lawrie, I'm a pumpkin, and the pigs may do their dammest with me.'

The implication is but I am not (a pumpkin, i.e. similar -- identicality in these metaphors is only a perfect form of similarity; hence these metaphors are only a perfect form of simile) and the speaker spells it out: "But I ain't a pumpkin, the Squire he knows that." (ibid.). Pumpkins and men are both examples of life, but men, being humans, are intelligent.

Or, in another example, the imputation is one of almost pure similarity (though we may assume that it stems from surprise at the perceived lack of difference):[11]

> "Das war der 'principe tedesco' von dem man so viel hörte? Dieser langweilige, grosse, phlegmatische Kürbis?"

Because of the basic difference between cucurbits and humans (humans are not vegetables), it may be an act of abuse to call someone cucurbitic names. On the other hand, because of the similarity (both being examples of life) to compare someone to a cucurbit may imply praise insofar as the positive features of the cucurbits are called to mind.

Because of the former of these the names of the cucurbits can function simply as words of abuse in metaphors and similes:[12]

> "Wer glaubst denn du zu sein,/dass du mich schelten willst, du Kürbiss?"

Also:[13]

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[10] John Galt, Lawrie Todd; or, The Settlers in the Woods. London: H. Colburn & R. Bentley. 1830. Volume 1, 90.

[11] Cf. H. Hroae, Berliner Philologischen Wochenschrift 12, 1914. 383; ref. to El-Correi, Westermanns Monatschrift 115.754.

[12] J.W. Goethe, Claudine von Villa Bella. Erster Aufzug. In Werke. Stuttgart/Tübingen: J.G. Cotta'schen Buchhandlung. 1828. Volume 10, 224.

[13] Rule a Wife, and Have a Wife. In The Works of Francis Beaumont and John Fletcher. Cambridge English Classics. Volume 3 (Act I, Scene I), 178.

O here's another pumpion,
Let him loose for luck sake, the cram'd son
Of a stav'd Usurer, Cacafogo, both their brains butter'd,
Cannot make two spoonfulls.

Or:[14]

Thou Dog-whelp, thou, pox upon thee what
Should I call thee, Pompion,
Thou kiss my Lady? thou scour her chamber-pot;
Thou have a Maiden-head? a mottly Coat,
You great blind fool, farewel and be hang'd to ye,

On the other hand, comparing a person to a cucurbit can be something highly positive. The idea of life is connected with the idea of the continuation of life, thus of reproduction, and the cucurbits are accordingly very rich in sex-connotations. The poet Theopompus in one of his plays used the word melon to describe a beloved woman who is more luscious than a ripe melon:[15]

μαλλαπωτέρα / πέπονος σικυοῦ μοι γέγονε.

Cf. also G.F. Ruxton:[16]

"Afore I left the settlements I know'd a white gal, and she was some pumpkins."

However, people have always approached sexual matters with somewhat ambivalent feelings and therefore there is often an element of ambiguity in these passages. Though his use is obviously in the main positive, Theopompus is after all a comic poet, and the American slang expression "some punkins" is typical of many American slang expressions in its ambiguity.

Because of the ambiguity inherent in co-present similarity and difference, and in the cucurbit as symbol, cucurbitic epithets in metaphors are very suited to the expression of ambivalent attitudes. The Jewish protagonist in Philip Roth's Portnoy's Complaint takes a very ambivalent attitude towards the shikse girl that he falls in love with at one stage. Therefore it is not surprising that he calls her "the pumpkin".[17]

[14] The Custom of the Country. In Works of Beaumont and Fletcher. Volume I (Act I, Scene I), 316.

[15] Athen. II. 68 d.

[16] George Frederick Ruxton, Life in the Far West. Edinburgh and London: William Blackwood and Sons. 1849. 266.

[17] Philip Roth, Portnoy's Complaint. London: Jonathan Cape. 1969. 216-32.

Because women have so often been given cucurbitic epithets -- positively, negatively, or ambiguously -- the feminist movement has inevitably become interested in the symbol that women are so often associated with. Accordingly the feminist Verena Stefan, in her Autobiografische Aufzeichnungen, explores her own attitudes to herself as a woman, and the various ideals of feminine beauty, and finally accepts being a "kürbisfrau"[18] with all that it entails of the swelling forms of breasts and hips etc.

Since cucurbits are associated with sex it is natural that the relevant parts of the body should be cucurbitically named. Thus we find "cucumis" in Plautus[19] associated with penis; "pyntegraeskar" for breasts, and "to sammenvoksede meloner" for nates, in Jørgen Nash[20]; the saying "to collect ἀγγούρια" (be a prostitute) in Mod. Gk.; the phallic garden-god, Priapus, is called the "cucurbitarum . . . custos"[21] etc. If these parts of the body are made artificially the ideal material is cucurbits; for an example of breasts made of gourds, see the Sut Lovingood-yarn "Sut Lovingood Reports What Bob Dawson Said, After Marrying a Substitute":[22]

> Why sister Sall, an' be durnd to you, she saw'd a round dry gourd in two, a gourd as big as my head, an' then made a hole in the middil ove each half, an' stuff'd in white oak acorns, butt first, an' dad shave me if she dident hist the whole contrapshun intu her buzzum.

Cucurbitic names are often used to imply sexual perversity. This is the case in Juvenal's sixth satire.[23]

> his violare cibos sacraeque adsistere mensae permittunt, et vasa iubent frangenda lavari cum colocyntha bibit vel cum barbata chelidon.

"Barbata chelidon" is undoubtedly feminine, the epithet semantically masculine. Undoubtedly the sex of the "colocyntha" is feminine. Precisely

[18] Verena Stefan, Autobiografische Aufzeichnungen: Gedichte, Träume, Analysen, Häutungen. München: Frauenoffensive. 1975. 123, see also 119.

[19] Plautus, Casina 907-13.

[20] Jørgen Nash, Galgenfuglen: Et Romaneksperiment. København: Gyldendals Tranebøger. 1967. 22.

[21] Priapea 63.12.

[22] George Washington Harris, Sut Lovingood's Yarns. Ed. M. Thomas Inge. New Haven: College & University Press. 1966. 280.

[23] Juvenal, Satires VI.365 (04-6).

what sort of sexual deviation is referred to is a moot point, but the character is probably an emasculated male.

All the cucurbits can function as symbols of sex, and specifically of either femininity or masculinity, but because of the difference in shape between the fruits of the various species there is some specialization due to intrinsic suitability (iconic relationship between signifier and signified), and thus the task of symbolizing masculinity is often assigned to the cucumber, whereas the more rounded fruit (pumpkin, melon, water-melon) are most often used to symbolize femininity (-- which, however, does not prevent pumpkin-seeds from being eaten for virility in Greece and Roumania: there are numerous exceptions). Because of this general tendency, which at times stabilizes into a fairly rigid code, it is possible to abuse a male by giving him a cucurbitic name symbolizing femininity, thus implying his lack of masculinity; or to abuse a woman by giving her a "male" cucurbitic name, implying her lack of femininity.

This throws some light on the phrase "O pepones" in Irenaeus. The author has just made violent fun of the gnostic Valentinus' cosmological structures, comparing his terms to a set of cucurbits,[24] and goes on to say, "O pepones, sophistae vituperabiles, et non viri (veri)". The Greek has only "Ὦ ληρολόγοι σοφισταί": The phrase "O pepones" is a misunderstanding (intentional?) of the epic "ὦ πέπονες" which has nothing to do with the fruit. Thus the line "O you pumpkins/weaklings, blameworthy sophists, and men no more", apparently plays not only on the absurdity of pumpkins but also on their femininity.

In a Greek work from the late nineteenth century the local match-maker in a village tries to talk the reluctant slim beauty of the village into marrying a young merchant boy whom the girl dislikes. The match-maker asks the girl why she is disgusted; does she not like the big cucumber? -- in Greek:[25]

Γιατί, θυγατέρα; δὲ σ' ἀρέσει ὁ ἀγγουρος;

Here, in the case of the boy, it is not a matter of a switch of sexes as in those passages in literature where an insufficient conformity with one's

[24] Interpres Irenaei Adv. haer. I.11.4; Patrologia Graeca VII, c. 567.

[25] Α. Καρκαβίτσας, Ἡ Λυγερή (Ἐν Ἀθήναις: Τυπογραφεῖον τῆς "Ἑστίας", 1896), σελ. 22.

own sex is implied, but rather a question of a heightening of the masculinity of the boy. The symbolic use of cucumber is so pronounced that it even determines the gender of the word. "Cucumber" in Mod. Gk. is neuter: τὸ ἀγγούρι. Here, however, the match-maker uses a masculine form: ὁ ἀγγουράκος.

In addition one would have expected the accent to fall on the penultimate syllable; the match-maker, however, puts the accent on the initial (the antepenultimate) syllable. She is really playing with the word, going against the expectations that the rules would create. She lengthens the word phonetically, which by analogy makes it seem as if there were that much more of the boy, as it were.

"Sjögurka" is used as a vaguely sexual taunt in Tove Jansson's Pappan och havet.[26] In Procopius' Anecdota Justinian's "praefectus urbis", Theodotus, is named "Pumpkin" which in this context -- considering that Theodora was a nymphomaniac -- must be a sexual nick-name.[27] The form is κολοκύντιον which is hypocoristic, probably implying insufficiency or lack of interest in Theodora's special attractions.

Cucurbits are used in connection with courtship in literature; sometimes positively as in Ken Kesey's Sometimes a Great Notion, in which one of the main male characters, Hank, gets his wife from a city labelled "The Watermelon Capitol of the World"[28]; sometimes negatively as in Tolstoy's The Kreutzer Sonata, in which the uxoricide Pózdnyshev, recounting with bitterness how he was lured into marriage, says that he was brought up in an atmosphere which produced enamoured young men as cucumbers are forced in a hot-house atmosphere:[29]

> - Да, так вот меня эти дверси, и лоханы, и нашлепки поймали. Поймать на меня легко было, потому что я воспитан был в тех условиях, при которых, как огурцы на парах;

and sometimes again ambiguously as in Dickens's Nicholas Nickleby where the "gentleman in small-clothes" courts Mrs Nickleby by throwing cucumbers and

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[26] Tove Jansson, Pappan och Havet. Helsingfors: Almqvist & Wiksell. 1975 (first published 1965). 144-6 & passim.

[27] Procopius, Anecdota 9.37.

[28] Ken Kesey, Sometimes a Great Notion. London: Magnum Books. 1976. 156-69 & passim.

[29] Л.Н. Толстой, Собрание сочинений, Том двенадцатый, ред. Н.Н. Аноповой, Н.К. Гудзия, Н.Н. Гусева, М.Б. Храпченко (Москва: Издательство "Художественная Литература", 1964), 150.

vegetable-marrows over the garden wall.[30]

In "watermelons" (sometimes "pumpkins") as a word of abuse for blacks in the United States several connotations are activated; laziness (immobility), stupidity, absurdity, rusticity and lack of class-status etc.; but the sexuality-myths about negroes also play a role, fitting in with the fertility- and sex-connotations of the cucurbits.

When Kunta Kinte in Haley's Roots compares the bandage on his foot to a pumpkin (it seems as big as a "punkin"),[31] there is a basic similarity in size, but symbolically the bandage on the wound that restricts his freedom, thus making him a true slave, should be associated with the favourite fruit of the American black slaves.

Life is closely linked with its opposite death, and the cucurbitic plants, which grow quickly and die easily, acquire numerous symbolic roles in connection with life-death. Athenaeus calls attention to the quick growth of the cucurbits[32] reporting that the very etymology of the words has been thought to imply vigour, vitality and fertility.[33] The translation of the Hebrew קִיקָיוֹן in Jonah IV.6. as κολοκύντη in the Septuagint and the corresponding "cucurbita" in the Vetus Latina has given rise to an extraordinarily rich tradition of the gourd symbolizing the quickly-growing but short-lived. For example:[34]

> A fire-new Noble, whom the war hath raised
> To price and currency, a Jonah's Gourd,
> An over-night creation of court-favour,

Or:[35]

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[30] Charles Dickens, Nicholas Nickleby. Ed. introd. and notes Michael Slater. Harmondsworth: Penguin. 1978 (first published 1839). 567-70, 616-22, 629, 737-43 & passim -- generally in chapters 37, 41 and 49.

[31] Alex Haley, Roots: The Epic Drama of One Man's Search for His Origins. London: Picador. 1977. 234.

[32] Athen. III. 74 c.

[33] Athen. III. 74 b.

[34] Samuel Taylor Coleridge, The Piccolomini: Or, The First Part of Wallenstein. A Drama. Translated from the German of Schiller. In The Complete Poetical Works. Ed. E.H. Coleridge. Oxford: Clarendon Press. 1912. Volume 2, 700 (Act IV, Scene VII).

[35] John Gauden, A Sermon Preached in the Temple-Chappel, at the Funeral of the Right Reverend Father in God, Dr. Brounrig, etc. London: Andrew Cook. 1660. 72.

"Yet we have lived to see many short-lived Gourd-Lords, created in a chaos of times from very small principles or preexistency of birth"

A very dramatic way to depict destruction and death is to show the Vergänglichkeit of the symbol of life itself, the gourd. Thus the withered gourd is considered a fitting image of destruction; cf. the following simile in Blake:[36]

And all the mountains & hills shrink up like a withering gourd.

Let us return to the two co-present ideas of similarity and difference to consider some further examples of cucurbits used when human life has become non-human and vegetable-like:[37]

'Of course, the people that doctors refer to as squashes,' pursued Fletcher, 'the invertebrates, you might say, just lie there like vegetables.'

In Méchamment les oiseaux by Suzanne Prou, the narrator is suffering from illness, primarily mental, and he compares his existence to vegetation, and accordingly likens his head to a cucurbit:[38]

Je ne me réjouis ni ne m'attriste. Je vis à peine. Je végète, allongé tout le long du jour, pareil à une plante rampante. Parfois, pour parfaire la ressemblance, il me semble que des feuilles me poussent, ici et là, que j'atteins les objets qui m'environnent avec des vrilles plutôt qu'avec mes mains. Ma tête enfle comme une coloquinte: je réfléchis; j'étudie le présent et le passé.

The whole of a human body need not be likened to a cucurbit. You can also compare any of its parts to a cucurbit to suggest some fault in the functioning of that part.

Thus Aristophanes about eyes in the Clouds, when Strepsiades cannot see what the philosopher sees in the sky. Socrates says:[39]

"νῦν γέ τοι ἤδη καθορᾷς αὐτάς,
εἰ μὴ λημᾷς κολοκύνταις."

[36] The Complete Writings of William Blake: With Variant Readings. Ed. Geoffrey Keynes. London: Oxford U.P. 1966. Jerusalem: The Emanation of The Giant Albion 1804 Printed by W. Blake Sth Molton St Written and Etched 1804-1820. Plate 66, l. 82.

[37] James Thurber, The Cane in the Corridor. The Thurber Carnival. Written and illus. James Thurber. Harmondsworth: Penguin. 1962. 45.

[38] Suzanne Prou, Méchamment les Oiseaux. Paris: Calmann-Lévy. 1971. 1212.

[39] Aristophanes, Nubes 327.

About legs cf. the expression "cucumber shins",[40] or consider Anaxilas:[41]

τὰ δὲ σκῶρ' ὄζει μᾶλλον ἢ σικυὸς πέπων.

Tertullianus, in a passage in Adversus Marcionem, on the incarnation, asks:[42]

> "Cur autem panem corpus suum appellat, et non magis peponem, quem Marcion cordis loco habuit?"

Marcion has a pumpkin for a heart, which suggests stupidity, since the heart was regarded as the seat of reason in antiquity.

Likening a head to a pumpkin in order to imply stupidity is widespread both in similes and metaphors in literature: cf. Wodehouse "head like a pumpkin"[43] or Joyce: "head like a prize pumpkin."[44] The word "pumpkin-head", implying stupidity, exists in many languages: e.g. Ger. Kürbiskopf; Croatian tvrda tikva; Bulgarian likewise тиква or крагуна ; It. cocomero, zucca zuccone, peponella, mellone, citrullo; Fr. melon, citrouille, cornichon; Sp. calabaza, sandio; etc.[45] All imply some stupidity, but if there are several capito-cucurbitic words in the same language there may be some gradation and division of labour. Thus in Mod. Gk. there is a rather clear hierarchy so that κολοκυδοκέφαλος , pumpkin-headed, is the most negative; καρπουζοκέφαλος , water-melon-headed, is sligthly milder; and πεπονοκέφαλος , melon-headed, even implies cleverness.

"Pumpkinhead" usually implies thickness, but it may also imply softness, which is equally damaging; or emptyness which is also bad, as in the Swabian saying, "Der hat'n Kopf wie eine Kürbis, vornen sind Kerne und hinten is nix".[46] Pumpkin-head may also be associated with baldness as in "as bald as a pumpkin shell"[47] (cf. It. "zucconare").

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[40] Washington Irving, Salmagundi: or, The Whim-Whams and Opinions of Launcelot Langstaff, Esq and Others etc. London: J.M. Richardson. 1811. Volume 1, 102. -- Another example: Robert B. Todd, (ed.) The Cyclopaedia of Anatomy and Physiology. London: Longman, Brown, Green, Longmans & Roberts. 1849-1852. Volume 4, Part 2, 1332, c. 1.

[41] Athen. II. 68 c and d.

[42] Tert. Adv. Marc. IV. 40. 3.

[43] P.G. Wodehouse, Joy in the Morning. London: Barrie & Jenkins. 1974. 9.

[44] James Joyce, Ulysses. New York: Random House. 1934. 159.

[45] Cf. also "stupidity", It. "melonaggine"; and "stupid talk", "nonsense", Mod. Gk. "κολοκύδια" (pl. of "το κολοκύδι").

[46] Hermann Fischer, Schwäbisches Wörterbuch. Tübingen: H. Laupp'schen Buchhandlung. 1901.

[47] Sir Samuel W. Baker, The Nile Tributaries of Abyssinia: And the Sword Hunters of the Hamran Arabs. London: Macmillan and Co. 1867. 208.

One should not put a crown on a cucurbitic head; cf. Crane: "And melons are crowned by the crowd."[48] The most famous parallel to this passage is Seneca's Apocolocynthosis of the emperor Claudius.

Looking at our material it was obvious that there was some variation. But this variation seemed to exist at a level of great specificity and there was always a common kernel to the passages, and always an explanation for the simile or metaphor in the biology of the cucurbit.

In "A piece of pure Gold in form of a Mellon"[49] the link is the yellow colour (apart from gold being a symbol of riches, and the cucurbits a symbol of fertility, which is the force that creates riches in a rural society).

In "the warm melon lay like a little sun on the tawny sand"[50] the sun and the melon have their circular form in common, apart from the melon being associated with summer warmth.

In the party of the Deipnosophistae, one of the participants, Clearchus, tells a story about a free-loader who is called "cucumber" (Σικύα) from the way he clings to parties.[51] This was predictable because of the clinging and clutching propensities of the cucurbits who are trailing plants with tendrils, needing the support of e.g. a prop or a garden wall -- i.e. b a s i c - a l l y t h e s u p p o r t o f o t h e r s .

John Hacket uses "Pumpian" to denigrate the excessive rhetoric of the Spanish:[52]

> But can that Nation pass over such a Triumph as this Entertainment, without Pumpian Words, and ruffling Grandiloquence?

"Pumpian Words" are naturally, like the cucurbits, characterized by excessive swollenness.

It is an amusing empiric test of people's cucurbitic competence to mention that Shakespeare calls only one of his characters "pumpion" and ask people to name the character. It is quite astonishing how most people will immediately pick Falstaff, who is fat (iconic relationship); absurd like a

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[48] The Poems of Stephen Crane. A critical edition by Joseph Katz. New York: Cooper Square, 1971. 93.

[49] London Gazette. 1691. No. 2724/2.

[50] The Poems of Tennyson. Ed. Christopher Ricks. London & Harlow: Longmans, Green and Co. 1969. 1278.

[51] Athen. VI. 257 a.

[52] John Hacket, Scrinia Reserata: A Memorial Offer'd to the Great Deservings of John Williams, D.D. Who some time held the Places of etc. London: Edw. Jones for Samuel Lowndes. 1693. Part I, 120.

pumpkin; humorous like a pumpkin; a glutton (cucurbits being a glutton's food); who drinks (wateriness connotations); and is at this stage in the Merry Wives unsuccesfully trying to seduce a woman (sex connotations).[53]

4. Conclusion

Having collected our examples of cucurbitic usage in literature, we had to ask ourselves in each case whether an occurrence was due to tradition or to independent creation. There was certainly tradition -- particularly rich in the two cases of Jonah and Seneca -- and there were certain set phrases which had developed into clichés.

Nevertheless it would be difficult to explain the remarkable consistency of the material merely in terms of adherence to convention. We are thus inclined to believe that although cucurbitic passages should be explained both in terms of convention and in terms of nature, the role of nature may be the most important. When a person reads or listens to a cucurbitic metaphor, perhaps sometimes, in order to interpret it, his thoughts go to his store of knowledge of a cucurbitic tradition, or maybe sometimes again to his store of knowledge of the plants or vegetables themselves; but we think that the latter is more important; partly since it can explain the interpretability of new metaphors. Even when a person has a knowledge of both convention and nature we still think that nature is most important, because constant reinforcement of the meaning from nature helps the convention to survive. In other words: it seems that using the stupid bird "goose" as a sign of stupidity is better than using an intelligent bird, since every user of the sign can then get at its meaning not only through his knowledge of the code (which could have been arbitrary), but also by deducing on his own the meaning of the sign through observing that part of nature from which it is taken.

We found that cucurbitic symbolism tended not to exist, or not to survive, in those parts of the world which lack the plants themselves. This might suggest that users of cucurbitic metaphors, even if the metaphors be primarily convention, nevertheless constantly revitalize the convention by fresh observation of that part of nature that the conventional metaphor originally stems from. Thus metaphors making use of nature (plants,

[53] The Arden Edition of the Works of William Shakespeare: The Merry Wives of Windsor. Ed. H.J. Oliver. London: Methuen & Co. 1971. 81 (Act III, Scene III, 35-36).

animals, metals etc.) preserve a link with their origin and are, to a high degree, non-arbitrary.

Whether you say "What an absurd pumpkin!" about a pumpkin, or "What an absurd man!" about a man, depends on which you want to talk about, the pumpkin or the man; and that is a choice between real-world objects and outside the realm of linguistics. But when you say "What an absurd pumpkin!" about a m a n , the pumpkin is no longer a real-world object but a sign in a system of meaning, and the investigation of its function should be regarded as part of linguistics.

Yet, even so, the capability of users of the sign to grasp its meaning -- their cucurbitic competence -- is not only dependent on their knowledge of cucurbitic tradition, but also, and maybe primarily, on their knowledge of cucurbitic nature. The study of metaphor is therefore one area where the investigator cannot ultimately escape reality.

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"HENCE"
AN ICONOCLASTIC STUDY ON LOGIC, LANGUAGE AND ARGUMENTATION

by

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0. Introduction[*]

To some extent logic can be viewed as a partial description of natural language and the art of argumentation. Unfortunately just what the scope of the expressions "to some extent" and "partial" mean, is often left vague. In other words, the relation of logic to natural language and ordinary reasoning is often unclear. This remarkable state of affairs can be explained in various ways. Some logicians think that the clarification of this relation is very difficult. In their view, it is not all surprising that we have not come to grips with it. Other logicians -- the majority, I feel -- are not interested in this relation. They feel that the

[*] This paper was presented at the 1977-1978 meetings of the Belgian Linguistics Circle and the Linguistics Association of Great Britain, to the Philosophy Department of the University of Warwick and the Linguistics Department of the University of Stockholm. A simplified Dutch version of this paper is Van der Auwera (1978a). Special thanks are due to the Belgian National Science Fund for the "ospitantschap" and for a travel grant for the trip to England.
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problem is not all that relevant. Some of them would go so far as to deny that the problem exists. For the latter logicians there simply are no interesting relations between on the one hand, logic and, on the other, natural language and every-day argumentation. Thus logicians of the foregoing types feel justified to concentrate on an entirely different program, namely that of the description and the construction of logical systems and the study of their potential use in the sciences.

D e s p i t e this peculiar vagueness and, no doubt, in part b e c a u s e o f its mystifying disconnection with empirical matters such as natural language and human inference patterns, logic has been exerting an enormous influence on the sciences, including linguistics. Thus, many linguists nowadays join in with the logicians in revering the latter's discipline and readily apply it. In this process, the peripheries of logic are modified, auxiliary hypotheses are introduced, but the empirical vagueness described above has so far largely escaped a critical scrutiny. This sharply contrasts with an expectation that linguists would have been very sensitive to the logician's disregard for natural language and that they would have seized an historical opportunity to repudiate the logician's nonchalance.

The spirit of the opening lines foreshadows the point of the paper. It will be my business to shed some light on the relation between logic, natural language and argumentation and I will embark on this project from the point of view of the linguist. There are two general restrictions here. First of all, I will limit myself to elementary propositional logic (PL). Secondly, I will focus my interests on a study of the word hence (and, implicitly, its near-synonyms[1] like therefore, thus, thence and so). Though the analysis allowed by these restrictions seems to me to be valuable in its own right, I will have to show why it can here serve as an illustration of some of my general ideas concerning the links between logic, natural language and human reasoning. As for the first restriction, elementary propositional logic simply is a most essential part of the whole logical enterprise. As for the second restriction, the preoccupation with the word hence, I claim that if logic has got anything at all to do with inferences, it must in some way deal with the word hence. Speaking on a pretheoretical,

[1] The difference between, on the one hand, hence, and, on the other, thus, therefore and thence is one of deixis. Hence is proximal (for t h i s reason). Thus, therefore and thence are distal (for t h a t reason). So is neutral in this respect (for s u c h a reason).

intuitive level, I believe it is obvious that it is precisely hence or one of its near-synonyms that marks a random sequence of sentences as an argument. Compare (1), (2) and (3).

(1) The sea is deep. The river is shallow.

(2) If the sea is deep, the river is shallow.

(3) The sea is deep. Hence the river is shallow.

(3) is an argument. (1) and (2) are not, though (2) could be the warrant of an argument. Compare also (4) and (5).

(4) If, first of all, the sea is deep and, secondly, the river is shallow if the sea is deep, then the river is shallow.

(5) The sea is deep. If the sea is deep, the river is shallow. Hence the river is shallow.

The theoretical agenda of the paper is the following. The first section is a very limited discussion of the standard logician's strategy of relegating hence to the realm of non-truth-functionality. In the second section I will advocate treating hence as a propositional logical connective after first having given the sentential calculus an alternative and radically natural language oriented semantics. The third section offers a partial explanation of why standard propositional logic, despite the vagueness concerning its relation to natural language and reasoning and despite its lack of interest for the word hence, has nevertheless been found respectable by generations of logicians and non-logicians. This respect, however, will be seen to rest on very shaky foundations.

1. Hence as a non-PL connective

The connectives of standard elementary propositional logic are t r u t h - f u n c t i o n a l . This means that the truth-value of the compound proposition or assertion -- I will here use these terms as synonyms -- is a function of the values of its components, to the extent that if one knows the truth-values of the simple propositions and if one has identified the connectives, there can be no doubt as to the truth-value of the compound. How this computation works, can be shown in the so-called "truth-tables". (6) to (9) are the most important ones, those of the conjunction, the disjunction, the material implication and the negation.

(6)

p	∧	q
T	T	T
T	F	F
F	F	T
F	F	F

(7)

p	∨	q
T	T	T
T	T	F
F	T	T
F	F	F

(8)

p	⊃	q
T	T	T
T	F	F
F	T	T
F	T	F

(9)

¬	p
F	T
T	F

If one wants to study the relation of propositional logic to natural language and reasoning, each of these tables is quite problematic. That of the material implication is perhaps the most troublesome. The closest ordinary language connective for the horse-shoe (⊃) would be if...then or at least the primary use of if...then that expresses an i n d i c a t i v e conditional, as exemplified in (2).

(2) If the sea is deep, the river is shallow.

If one accepts the first (horizontal) line of table (8), one would have to say that the truth of both antecedent and consequent is sufficient for the truth of the indicative conditional. A deep sea and a shallow river would guarantee a true assertion that this river is shallow if this sea is deep. This is clearly counterintuitive.

The last two lines of table (8) are vexing as well. Assuming that ⊃ stands for an if...then like the one in (2), then (2) would be true for a situation in which the sea is not deep, whether the river is shallow or not.

A typical solution is the following. The material implication only p a r t i a l l y renders the indicative if...then. From a classical truth-functional point of view, the material implication is the best the logician can some up with, and, at least, he successfully describes that the indicative conditional is certainly false whenever the protasis is true and the apodosis false. That a conditional could have non-truth-functional properties, such as some causality or relevance linking up protasis and apodosis, that would not be of his concern.

This already allows for a simple, but important conclusion: connectives can be only p a r t i a l l y truth-functional to enjoy the truth-functional account of propositional logic.

But there are less fortunate connectives: those that simply do not qualify for a truth-functional treatment. One such connective is hence.

(3) The sea is deep. Hence the river is shallow.

For concluding that (3) is true, Quine (cp. Quine 1965:23) might say that one has to be convinced of a causal connection between the depth of the sea and the shallowness of the river. It would not be sufficient that the sea is deep and the river shallow. Does this point of view imply that there is nothing truth-functional about hence? No, I believe. Hence or at least the use of hence exemplified in (3), which one could call the "indicative" hence, parallels the indicative if...then in that a compound proposition is false when the first proposition is true and the second false. Both (2) and (3) are false when the sea is deep and the river is not shallow. So why, one wonders, did Quine flatly call hence "non-truth-functional"? What is the reason for excluding hence from the set of orthodox PL connectives?

Part of the answer will be reserved for the third section of this paper. Another part might be that, if integrated into standard PL, hence would create a big problem. Let us try to construct a truth-table for hence and see what happens.

We already know how to write the second line. If the first constituent is true and the second false, we get the value 'false'. When both propositions are true, the compound proposition seems to be true, whether one credits this value to a similarity of hence and a simple conjunction -- note the optinality of the word and in a hence construction -- or to its resemblance to if...then -- both constructs seem to share the element "causal connection".

(10) The sea is deep and hence the river is shallow.

From both the conjunctive and the implicative point of view, the truth of the constitutive propositions guarantees the truth of the whole. For the third and the fourth line the affinity with the conjunction seems to outweigh the correspondence with the implication. That is, the intuitively most satisfying solution, so it appears to me, is to say that when the sea is not deep, the compound The sea is deep. Hence the river is shallow. is plainly false. The resulting hence table is (11). The symbol for hence is

the turnstile (⊢).

(11)

p	⊢	q
T	T	T
T	F	F
F	F	T
F	F	F

Should one, for some reason or other, want to emphasize the correspondence with the conditional and consider the falsity of the first proposition as sufficient for the truth of the whole proposition, one ends up with the table in (12).

(12)

p	⊢	q
T	T	T
T	F	F
F	T	T
F	T	F

Either way, one is confronted with an interesting problem. The hence table is identical with that of another connective, either the conjunction or the material implication.

This difficulty can be removed by claiming that indicative hence and either and or indicative if...then only differ on something like a "rhetorical" level. This is the type of explanation that is sometimes (e.g. Quine 1965:15-17, and Mates 1972:81) given for the distinction between, on the one hand, and and, on the other, but and although.

Yet a logician who wants to give a partial, truth-functional description of the truth-conditions of indicative hence, but who is also, as much as possible, trying to save the traditional viewpoints, should not turn to this type of explanation. The reason for not following up this strategy is that, while a but case rests on the idea that but and and have identical truth-conditions, all of which are truth-functional, the initial observation for hence, which prompted the decision to call it "non-truth-functional", is that it has quite special truth-conditions, different from indicative if...then and and, both of which get truth-functional counterparts.

Let me sum up some important problems: (i) there is a fairly strange procedure to force if...then into truth-functional shackles;

(ii) there is, to my knowledge, no real justification for why hence is not given this treatment;
(iii) if hence should receive the type of formalisation that if...then has come in for, one is confronted with a somewhat disturbing coalescence of the tables of different connectives.

This catalogue suggests:
(i) that one could venture to try out an alternative analysis for if...then;
(ii) if this would be successful, one should use this new perspective to look at hence again;
(iii) if this would be successful as well, one should see what is left of the problem of the identity of truth-tables.

Before turning to this three-fold task it is worth looking at one more proposal for how to deal with hence, the very influential initiative of Grice (1975:44-45). In order to account for the non-truth-functional character of hence, Grice relies on his distinction between the meaning that is expressed in a direct and explicit way and the meaning that is only suggested, implied or, to use his own term, "implicated". Grice would say that the speaker of (3) expresses or says that the sea is deep a n d that the river is shallow but n o t that the second follows from the first. This consequence relation would only be implied, though it would be implied in a very specific way. This " i m p l i c i t " meaning -- the term is my own -- is carried by the conventional meaning of the word hence. This kind of e x p l i c i t i m p l i c i t meaning is called "conventional implicature".

I have the impression that this concept is a result of Grice's logical orientation. The best that can be said in the framework of classical propositional logic about the truth-conditions of hence, is that they are identical with those of and. If two expressions have the same truth-conditions, according to this logic, they have the same meaning. At first sight, this would be unacceptable, since, clearly, and and hence are far from synonymous. Maybe this is what Grice has in mind when he comes up with a solution that accounts for the semantic difference between and and hence and that saves logic. He stipulates that these connectives have the same explicit meaning but that hence suggests some extra, implicit meaning. The heart of the matter is that Grice relegates the non-truth-functional aspects of hence to a level of suggestion. I doubt whether this strategy, which is presumably prompted by purely theoretical motives, still reflects empirical reality. Is it not contradictory to consider some meaning as implicit in

the presence of a sufficient overt sign? If one could solve the three-fold task mentioned above, it might well earn a higher degree of credibility, since Grice's solution seems to be inveracious. Notice how my account would be simpler, too, if integrating indicative hence into propositional logic would amount to no more than to enlarge the scope of a type of analysis that has been argued for on distinct grounds, thus eliminating the need, as felt by Grice when he studied a word like hence[2], for an additional concept of "conventional implicature".

2. Hence as a PL connective

In this section indicative hence will be given the status of a PL connective. Its truth-table will differ from that of and and if...then. Indicative if...then will be given an unorthodox PL table. All this is based on a radically natural language oriented semantics. I cannot here present or defend this semantics in all its details and with respect not just to the classical semantics but also other non-standard interpretations, but, in order to fight the risk of idle allusiveness, I must sketch some essentials.[3]

First, a terminology is needed. Part of it can be obtained from the well-known distinction between necessary, sufficient and necessary and sufficient conditions. Take (2) again.

(2) If the sea is deep, the river is shallow.

According to this assertion, the depth of the sea guarantees the shallowness of the river. The former is sufficient for the latter. But it is not necessary. It is consistent with (2) that the river is shallow if the ocean is deep. The shallowness of the river, however, is necessary for the

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[2] This qualification is necessary because I do not want to rule out that there are reasons that do not depend on the analysis of hence for introducing a concept of "conventional implicature".

[3] This note replaces a large set of notes that could be attached to many of the claims made in the rest of the paper. I first presented this type of semantics at the 1977 California Linguistics Association Conference. Some aspects of it are treated in Van der Auwera (1977; 1978b; 1978c). The most comprehensive account will be found in my 1979 doctoral dissertation called The refutation of meaning. Conjectures on the semantics and pragmatics of natural language.

sea to be deep. But it is not sufficient. It is consistent with (2) that it would take a shallow river and a deep ocean to make the sea deep. This illustrates the difference between a condition that is necessary though not sufficient and one that is sufficient though not necessary. These properties do not exclude each other. Should the conditional start out with an additional only, it would tell us about a necessary and sufficient condition for a shallow river.

(13) Only if the sea is deep, the river is shallow.

In a second stage this distinction is brought to bear on the idea of u n f a l s i f i a b i l i t y . An assertion may be unfalsifiable with respect to a particular world or state of affairs for various reasons. Take the assertion in (14)

(14) There is a black swan sitting on an epistemologist.

The world that (14) is supposed to refer to, could be such that there is indeed a black swan sitting on an epistemologist. There is no way to say that (14) is false. As a matter of fact, the world has all that is necessary and sufficient to call the assertion a true one.

Suppose now that the world has t w o black swans sitting on the epistemologist. Again (14) is irrefutable, yet the constitution of the world is no longer necessary, but only sufficient for the truth of (14). We do not need two swans in order to truthfully say that there is one. Yet, twoness is enough for oneness.

Finally, suppose that the world with the one black swan is being approached with assertion (15).

(15) There is a black swan sitting on a surprised epistemologist.

Now, whether the epistemologist is surprised or not in the world under consideration, is undetermined. He may be, or he may not. The problem concerns one of the "p o i n t s o f i n d e t e r m i n a t i o n" of this world. Like any other world, it has got lots of these points. It is not clear e.g. whether the beak of the swan has two white dots on it, whether it is sitting on the epistemologist's head or arm, whether he even has arms or whether the universe of this person is, astronomically speaking, expanding or not. One might object, of course, and say that worlds are fully determined and that our knowledge is defective. This is a metaphysical question concerning which I do not take a stand, partially because I do not know an answer and partially because it does not matter here anyway. I am

not interested in the correspondence between language and worlds such as they really are, since I do not know how they really are and I think that any claim on their nature is an interpretation such that one would no longer be confronted with the real worlds but only with epistemic constructions, that is, our views of these worlds. In a different jargon still, my worlds are epistemological and I think that necessarily all talk about ontological worlds reduces them to epistemological ones. Let me conclude this digression with the claim that the worlds I am speaking about are not the potentially fully determined and as such unknown and only partially understood, but the equally partially known and hence partially undetermined worlds. To come back to the truth-value of (15) in the world in which there is one black swan sitting on an epistemologist, we cannot call the assertion false, yet the world does not fulfill sufficient or sufficient and necessary conditions to call it true either. As it happens, it just contains a necessary condition for its truth. In order to truthfully say about a state of affairs that there is a black swan sitting on a surprised epistemologist, it must be sitting on an epistemologist.

I described three world-statement pairs. Whether the world contained necessary and sufficient, only sufficient or only necessary conditions, the statement could never be called 'false'. In the first two cases it is actually 'true'. On the basis of this typology, three types of non-falsity will be defined. An unfalsifiable statement is 'T_{ns}' if the correspondence concerns necessary and sufficient conditions for its truth. It is 'T_s' with respect to a world of conditions that are sufficient but not necessary for its truth. It gets 'T_n' in comparison with a state of affairs of necessary but insufficient conditions for truth. T_{ns} and T_s statements are true.

To sum up: I took the standard distinction between necessary, sufficient, and necessary and sufficient conditions and used it to define three types of non-falsity. But tradition is not good enough this time. This four-way distinction between falsity and three types of non-falsity is not exhaustive. Consider the following situation. The world contains a child and the assertion is (16).

(16) There is a human being and there is an elephant.

The presence of a child is sufficient for the presence of a human being. But the latter is only a necessary part of the presence of both a human being and an elephant. So there are conditions that are only sufficient for a necessary condition for truth ("s_n-conditions"). Compare the world

with the child with statement (17), too.

(17) There is a boy or an elephant.

Is it necessary to exist as a child in order to enjoy potential elephanthood? The answer is negative. The same response should go to the question whether childhood is at least sufficient. Childhood is really only necessary for one of the sufficient conditions for an existence that is either boyish or elephantish. So we arrive at a fifth type of condition: the one that is necessary for a sufficient condition ("n_s-condition") (cp. Mackie 1965).

As it stands, every n_s-condition can also be looked upon as s_n-condition. Take (17) again. It is necessary that there is either a child or a large animal, for which it is sufficient that there is a child. This would obviously make the distinction between n_s-conditions and s_n-ones entirely useless. To take care of this problem, s_n-conditions will be given a narrower definition. The necessary conditions they are sufficient for, should only be the ones that by c o m p l e m e n t i n g each other make up a ns-condition. Since there is no such necessary condition for an existence that is either boyish or elephantish, there is no s_n-condition either. So the presence of the child ceases to be s_n. It remains s_n, though, for the presence of both a human being and an elephant.

This account should make one wonder whether this search for conditions could not go any further. I do not think it could. In other words, I believe that this typology is exhaustive. But since I do not need any potential extra type of condition in the rest of this paper anyway, I can here leave this claim unargued for.

Since the world with the one child falsifies neither (16) nor (17), these conditions allow for two more types of non-falsity. An unfalsified statement will be called 'Ts_n' iff the world provides a condition that is neither sufficient nor necessary nor necessary for a sufficient condition for the truth of the statement, but one that is only sufficient for a complementary necessary condition for truth. A non-false statement is 'Tn_s' with respect to a world of conditions that are neither sufficient nor necessary nor sufficient for a complementary necessary condition but only necessary for a sufficient condition for truth. Neither T_{n_s} nor T_{s_n} statements are true.

Notice that the stipulation that a T_{n_s} statement cannot also be T_{ns}, T_s, T_n, T_{s_n} is of particular relevance here. Without this restriction n_s-conditions would be unique in that all other types of conditions can be looked upon in this way. So, in a sense, all other types of conditions would

be special cases of n_s-conditions. But these other types do not exhaust the typology of n_s-conditions. There are still those that are o n l y necessary for a sufficient condition and only these are the ones which I make the term "n_s-condition" refer to.

I have now described five types on non-falsity. Whenever I find the opposition between false and non-false, I could try to subcategorize the non-falsity. This procedure will now be applied to the standard truth-tables of propositional logic. 'F' and 'T' will be taken to refer to "false" and "non-false", respectively. In a bivalent logic "non-false" equals "true" but in my logic T will be interpreted in terms of five types of non-falsity, i.e. T_{ns}, T_s, T_n, T_{s_n} and T_{n_s}. The result is a six-valued logic.[4]

I shall here only investigate the computation of compound propositions of which the components are, if T, T_{ns}. This means that the truth-tables that will be shown in this paper are far from complete. This is a strategical restriction. As will be shown later on, these fragmentary truth-tables will be sufficient to show the differences between the natural language connectives under consideration.

Let us turn to the material implication, first. How, then, are the T's to be interpreted according to my six-valued logic? The question regarding the first line could be put as follows: what type of condition does a world in which it is T_{ns} that the sea is deep and the river is shallow exhibit with respect to a T_{ns} indicative conditional that the river is shallow if the sea is deep? This juxtaposition of the depth of the sea and the shallowness of the river is certainly not sufficient. A fortiori, it is not necessary and sufficient. It is not even necessary. The conditional relation between the depth of the sea and the shallowness of the river d o e s n o t f o r c e the sea to be deep and the river to be shallow. But what is absolutely necessary for this conditional to be T_{ns} is that it is at least p o s s i b l e for the sea to be deep and the river to be shallow. Observe that if this possibility is doubtful or non-existent, subjunctive conditionals are to be used.

(18) If the sea were deep, the river would be shallow.

(19) If the sea had been deep, the river would have been shallow.

I take it for granted and I do not argue the case here that the necessity of the possibility for the sea to be deep and the river to be shallow

[4] This is one of the many simplifications of this paper (cp. note 3). If a similar interpretation is worked out for F, one will find that we actually need a s e v e n - v a l u e d PL.

belongs to the set of necessary conditions that complement each other and turn up a ns-condition. Now, for this complementary n-condition the state of affairs of the first line of the truth-table, i.e. the one in which the sea is deep and the river is shallow, is obviously sufficient, though not necessary. So a conjunction of the depth of the sea and the shallowness of the river provides a s_n-condition for the truth of the conditional. Since it clearly does not falsify the conditional, the latter will be judged T_{sn}.[5]

A more complicated argument will yield the same value for the third and the fourth lines. It is a complementary necessary condition for the river to be shallow if the sea is deep that it is possible that the sea is deep and the river shallow. Observe that it may well be necessary. For a world in which the sea is necessarily deep and the river necessarily shallow, it would be perfectly possible that the latter depends on the former in a manner indicated by the indicative conditional. However, this necessity, though possible, is itself n o t n e c e s s a r y . The non-necessity of the necessity of the depth of the sea and the shallowness of the river is again, I would claim, a complementary necessary condition for the truth of the indicative conditional. Sufficient conditions for this condition are provided when the sea is not deep and/or the river is not shallow, that is, the states of affairs of the second, third and fourth lines of the implicative table. So, these states of affairs indicate s_n-conditions for the truth of the indicative conditional. That of the second line, however, is very different from the others. The second falsifies the conditional. The third and the fourth do not. The second, therefore, correctly gets the F and the third and the fourth get a T_{sn}.

This gives the following implicative table:

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[5] If the reader does not accept that the necessity of the possibility for the sea to be deep and the river to be shallow is one of the c o m p l e m e n t a r y necessary conditions for the truth of the conditional, what I have considered to be obvious, he will conclude that the appropriate value for the first line is T_{n_s}. For the purpose of this paper, this is equally good. A similar qualification is due for my analysis of the third and the fourth lines.

(20)

p	⊃	q
T_{ns}	T_{s_n}	T_{ns}
T_{ns}	F	F
F	T_{s_n}	T_{ns}
F	T_{s_n}	F

Let me, for the purpose of this essay, add a very brief discussion of the negation, the conjunction and the disjunction. The point is simply to suggest that my analysis of non-falsity can be made useful for the other connectives, too. For standard conjunctions and negations of elementary propositions, the T of the compound will simply be interpreted as T_{ns}.

(21)

p	∧	q
T_{ns}	T_{ns}	T_{ns}
T_{ns}	F	F
F	F	T_{ns}
F	F	F

(22)

¬	p
F	T_{ns}
T_{ns}	F

Standard disjunctions are more interesting. Take an ordinary language example.

(23) The sea is deep or the river is shallow.

For its T_{ns} non-falsity it is sufficient, but not necessary that e.g. the sea is deep. (24) is the T-interpreted table.

(24)

p	v	q
T_{ns}	T_s	T_{ns}
T_{ns}	T_s	F
F	T_s	T_{ns}
F	F	F

It is time to draw explicit attention to the relevance of this analysis for the three difficulties of the preceding section. To begin with the problem of the classically interpreted material implication. What it shows about some uses of *if...then* is only that such assertions are false, if protasis is true and apodosis false. The horseshoe table itself does not even show that there are non-truth-functional aspects to *if...then*. Furthermore, that a material implication is true in case both constituents are true or when the first is false, is in contradiction with the properties of the common indicative conditional. So there are at least two problems. The alternative semantics solves the second problem entirely, the first at least partially. A transformation of the uninterpreted T -- implicitly known to be either T_{ns} or T_s -- into T_{sn} is enough to take care of the correspondence with the natural language indicative conditional. As to the first problem, the presence of T_{sn} is an absence of a stronger type of T, a sure indication of the importance of truth-conditions that cannot be captured with truth-functional means. Thus, in the alternative semantics, at least the non-truth-functional aspects are clearly avowed to exist.

I now come to *hence*. Table (11), intuitively more satisfying than (12), had just one T. Let it be T_n, since, indeed, for the truth of (3) it is not sufficient, but still necessary that the sea is deep and the river shallow. This gives us table (25).

(25)

p	⊢	q
T_{ns}	T_n	T_{ns}
T_{ns}	F	F
F	F	T_{ns}
F	F	F

At the same time the third problem is disposed of. The tables for *and*, *if...then*, and *hence* are no longer identical.

To sum up:
(i) hopefully, this analysis is one step towards a conception that is more explicit and precise than the traditional one, of how propositional logic can be seen as a description of argumentation and natural language;
(ii) from this point of view, material implication no longer serves any purpose and the horseshoe simply becomes a symbol for the indicative *if...then*;
(iii) this approach allows for an interpretation of the word *hence*, that seems to refer to a central aspect of reasoning and for which I have not seen a justification as to why it would not be entitled to a propositional logical counterpart.

3. Towards explaining conservatism

In this final section I will briefly deal with two very important and related questions. Why is it, first of all, that propositional logic is so highly respected despite its fairly strange account of *if...then* and, more generally, the vagueness concerning its relation to reasoning and natural language. At least part of the answer is, I believe, that it is an authentic, but insufficiently realized task of logic to study f a l s i f i c a - t i o n , the problem of w h e n assertions are false and non-false. H o w they are non-false, in other words, whether they are T_{ns}, T_s, T_n, T_{sn} or T_{ns} is not to the point, or at least much less so. For the study of falsifiability the differentation into five types of non-falsity can to a large extent be neglected. This is also what logicians do. It does not imply that it can be disregarded for all purposes. Unfortunately, this, too, seems to be the practice of logicians.

Secondly, why can propositional logic live without *hence*? At least part of the reason, I claim, is that the types of *hence* constructions that interest the logician, are those that derive something that can be called "validity" from their own structure and the structure of the assertions that normally precede the *hence* construction, and that this structural element can to some extent be reflected with a description in terms of horseshoes. Take (5) again.

(5) The sea is deep. If the sea is deep, the river is shallow.
Hence the river is shallow.

This is a set of assertions that fascinates a logician. What is so remarkable about it is that the conjunction of the implication and the third

assertion has the very same truth-functional truth-conditions as the hence construction of the whole conjunction and the fourth assertion. Relying on the full machinery, which I have not defended here, this is shown in (26).

(26)

((p	⊃	q)	∧	p)	⊢	q
T_{ns}	T_{s_n}	T_{ns}	T_{s_n}	T_{ns}	T_{s_n}	T_{ns}
T_{ns}	F	F	F	T_{ns}	F	F
F	T_{s_n}	T_{ns}	F	F	F	T_{ns}
F	T_{s_n}	F	F	F	F	F

Yet, this same phenomenon is demonstrated with the proof that ((p q) q) is never false. It is a so called "logical implication".

(27)

((p	⊃	q)	∧	p)	⊃	q
T	T	T	T	T	T	T
T	F	F	F	T	T	F
F	T	T	F	F	T	T
F	T	F	F	F	T	F

This is the procedure of the "tautological corresponding conditional".

Thus, to render this very interesting property of hence, it seems that one does not have to introduce hence itself into propositional logic. But, first of all, this does not mean that there are not any other reasons for doing so. Secondly, the fact that the "corresponding conditional" method of (27) at least sometimes coincides in results with the explicit hence method of (26) does not mean that they always coincide. In particular, they d o n o t with respect to so-called "logical paradoxes"!

However, -- to end this paper in an allusive but hopefully at least still polemic note -- the subject of "the proper treatment of logical paradoxes" would be beyond this paper, as well as, clearly, a full-scale account of " a s i x - v a l u e d p r o p o s i t i o n a l s e m a n t i c s f o r n a t u r a l l a n g u a g e ", which, I think, is actually s e v e n - v a l u e d (see note 4), which is not even a semantics but a p r a g m a t i c s , and which includes a m o d a l fragment.

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MONTAGUE GRAMMAR AND THE AIMS OF LINGUISTICS AND LOGIC

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0. Introduction

One general aim of this paper is to reveal "the true nature of Montague grammar" as it is manifested in Richard Montague's 'The Proper Treatment of Quantification in Ordinary English' (henceforth abbreviated to PTQ). We think certain philosophers and especially certain linguists would have been less enthusiastic about PTQ if they had realized what it is really about.

The second general aim is to discuss certain fundamental methodological questions concerning the aims of logic and linguistics which PTQ has largely inspired us to ask.

Section 1 below is essentially of a preparatory character. The fragment of English specified in PTQ is presented as well as the semantic apparatus of the fragment, including its semantic rules and postulates. The functioning of the semantic rules is illustrated by means of an example. We do not, however, explicitly list or comment on the syntactic rules of the fragment in this paper, since these have been extensively discussed elsewhere (cf. Partee 1975, 1976).

In section 2 the important aim of PTQ is supposed to be the construction of a device, which simulates certain aspects of the competent native English speaker's metalinguistic behavior with respect to the (or only certain interesting) sentences, and arguments in the specified fragment of

English. It is shown that PTQ is not entirely succesful in this respect. The introduction of an intensional logic which translates extensional English sentences into formulas resembling as much as possible the formulas of ordinary extensional logic (=predicate logic) normally representing extensional English sentences is assumed to be another, less important, aim of PTQ. The role of the various semantic postulates with respect to these and other aims is discussed.

1. Montague's fragment of English, its phrases, semantic rules, and semantic postulates

In the syntactic part of PTQ an infinite set of sequences of atomic expressions is defined with the help of an infinite set of basic phrases, BP, and a set of syntactic rules. The set of sequences is called a fragment of English, the reason for naming it thus obviously being that almost all native speakers of English would intuitively recognize many of the sequences as printed sentences or phrases of their mother tongue. BP is partitioned into subsets in such a way that every member of BP belongs to exactly one subset. The subsets and their respective members are

BP_{IV} = {run, walk, talk, rise, change}
BP_{T} = {John, Mary, Bill, ninety, he_0, he_1, he_2, ...}
BP_{TV} = {find, eat, lose, love, date, be, seek, conceive}
BP_{IAV} = {rapidly, slowly, voluntarily, allegedly}
BP_{Cn} = {man, woman, park, fish, pen, unicorn, price, temperature}
$BP_{t/t}$ = {necessarily}
$BP_{IAV/T}$ = {in, about}
$BP_{IV/t}$ = {believe that, assert that}
$BP_{IV//IV}$ = {try to, wish to}

When B is any of the indices attached to BP above, BP_B is read "the set of basic phrases of category B". We observe that any set of basic phrases of any category except of category T is finite and contains as members only entities which all competent native speakers of English would intuitively classify as printed words or phrases of their language. BP_T, however, is observed to be infinite and to contain he_0, he_1, he_2..., which most probably many native English speakers would not recognize as printed

words or phrases of their language.

With the help of the syntactic rules S1-S17 (cf. PTQ:224-5) the sets P_B are defined when B is any of the indices attached to BP above, or t. P_B is read "the set of phrases of category B". The indices attached to P are called categories. Consequences of the definition of the P_B:s are:

For all B, $BP_B \subseteq P_B$
$B_{IV} \subset P_{IV}$, $B_T \subset P_T$, $B_{TV} \subset P_{TV}$, $B_{IAV} \subset P_{IAV}$, $B_{Cn} \subset P_{Cn}$
$B_{t/t} = P_{t/t}$, $B_{IAV/T} = P_{IAV/T}$, $B_{IV/t} = P_{IV/t}$, $B_{IV//IV} = P_{IV//IV}$
For the category t, P_t is infinite, although PB_t is empty
For some category B, P_B is infinite and contains entities not recognised by many native English speakers as printed English sentences or phrases
Any element in any P_B belongs only to P_B.

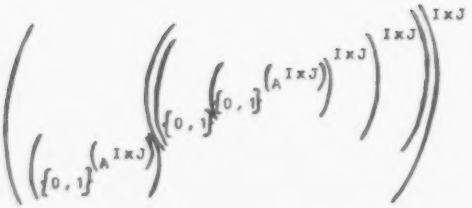
Given any three sets A, I, J (interpreted by Montague as the set of possible individuals, the set of possible worlds, and the set of moments of time, respectively the set of possible intensions corresponding to a given category B with respect to A, I and J is defined as follows:

The sets of possible intensions corresponding to IV, T, TV, IAV, Cn, t/t, IAV/T, IV/t, IV//IV, and t are

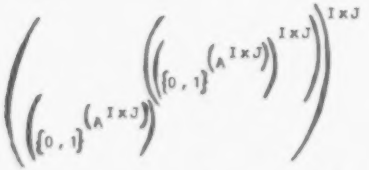
intensions corresponding to IV: $\left(\{0,1\}^{(A^{I\times J})}\right)^{I\times J}$

intensions corresponding to T: $\left(\{0,1\}^{\left(\{0,1\}^{(A^{I\times J})}\right)^{I\times J}}\right)^{I\times J}$

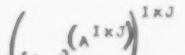
intensions corresponding to TV:



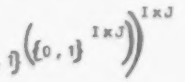
intensions corresponding to IAV:



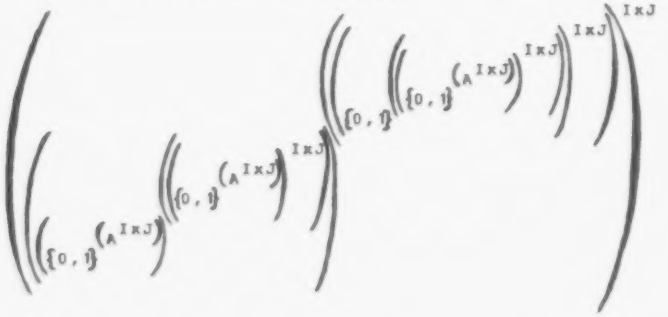
intensions corresponding to Cn:



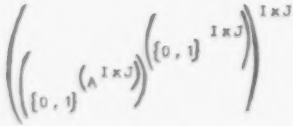
intensions corresponding to t/t:



intensions corresponding to IAV/T:



intensions corresponding to IV/t:



intensions corresponding to IV//IV:

$$\left(\left(\{0,1\}^{\left(A^{I\times J}\right)}\right)^{\left(\{0,1\}^{\left(A^{I\times J}\right)}\right)}\right)^{I\times J}$$

intensions corresponding to t:

$$\{0,1\}^{I\times J}$$

It should be observed that the first and the fifth, and the fourth and the ninth sets are identical. As variables for elements in the first (=fifth), second, third, fourth (=ninth), sixth, seventh, eighth and the tenth set above are below used P and Q; W; Z; L; N; R; K and P, respectively. Later some other variables and sets are needed which it is convenient to introduce in this connection. As variables for elements in I, J, A, and $A^{I\times J}$, i; j; u and v; x, y and x_n (where n ranges over 0,1,2...), respectively, are used. M, S, U and G range over elements in

$$\left(\{0,1\}^{A}\right)^{I\times J}, \quad \left(\left(\{0,1\}^{A}\right)^{A}\right)^{I\times J},$$

$$\left(\left(\{0,1\}^{A^{I\times J}}\right)^{\left(A^{I\times J}\right)}\right)^{I\times J}, \text{ and}$$

$$\left(\left(\left(\{0,1\}^{\left(A^{I\times J}\right)}\right)^{\left(\{0,1\}^{\left(A^{I\times J}\right)}\right)^{I\times J}}\right)^{A}\right)^{I\times J}, \text{ respectively.}$$

The set of possible denotations (or extensions) corresponding to category B with respect to A, I, and J is arrived at by deleting the outermost IxJ in the expressions denoting the set of possible intensions corresponding to the category B with respect to A, I, and J.

An intensional model for the defined fragment of English (that is UP_B, where B varies as above stated) is a ninetuple $\langle A, I, J, jo, m, b, n \leq F \rangle$ such that

(1) A, I, and J are non-empty sets
(2) jo, m, b, and n are designated elements in A^{IxJ} (the possibility that they are four, three, or two different elements of the same element in A^{IxJ} is left open)
(3) $\leq$ is a simple (that is, a linear) ordering that has J as its field
(4) F is a function such that
  a. BP is its domain
  b. if α is in BP_B, then $F(\alpha)$ is in the set of possible intensions corresponding to B with respect to A, I, and J
  c. F(be) is the Z such that for any i, j, W, and x, $Z(i,j)(W)(x)=1$ iff $W(i,j)(P)=1$ where P is the function such that for any i', j', y, $P(i',j')(y)=1$ iff $x(i',j')=y(i',j')$
  d. F(necessarily) is the W such that for any i, j, and p, $W(i,j)(p)=1$ iff $p(i',j')=1$ for all i' and j'
  e. F(John) is the W such that for any i, j, and P, $W(i,j)(P)=1$ iff $P(i,j)(jo)=1$
     F(Mary) is the W such that for any i, j, and P, $W(i,j)(P)=1$ iff $P(i,j)(m)=1$
     F(Bill) is the W such that for any i, j, and P, $W(i,j)(P)=1$ iff $P(i,j)(b)=1$
     F(ninety) is the W such that for any i, j, and P, $W(i,j)(P)=1$ iff $P(i,j)(n)=1$.

Suppose that $\mathcal{A} = \langle A, I, J, jo, m, b, n \leq F \rangle$ is an intensional model for the defined fragment of English, and that g is an $\mathcal{A}$-assignment of values to the variables x, y, and x_n, that is, a function the domain of which is x, y, and x_n, and the values of which are in A^{IxJ}. Suppose also that $F(he_n)$ is the W such that for any i, j, and P, $W(i,j)(P)=1$ iff $P(i,j)(g(x_n))=1$. Then the result of the definitions above is that, given an intensional model $\mathcal{A} = \langle A,I,J,jo,m,b,n \leq F \rangle$ and an $\mathcal{A}$-assignment g, every basic phrase α of any category B has, in a very special way, associated with it relative to $\mathcal{A}$ and g exactly one function $F(\alpha)$ with domain IxJ in the set of possible intensions corresponding to B with respect to A, I, and J. This function is referred to by the expression $\alpha^{\mathcal{A}g}$ which is to be read "the intension of α with respect to $\mathcal{A}$ and g". By $\alpha^{\mathcal{A}g}(i,j)$, abbreviated to $\alpha^{\mathcal{A}ijg}$, are defined the denotations of α with respect to $\mathcal{A}$, i, j, and g. In the defined fragment of English are, however, not only basic phrases of any category associated relative to an $\mathcal{A} = \langle A,$

I,J,jo,m,b,n ≤ F⟩ and g with functions with domain IxJ, but also every non-basic phrase of any category B is relative to an $\mathcal{A}$ = ⟨A,I,J,jo,m,b,n ≤ F⟩ and g associated with exactly one or m o r e functions with domain IxJ contained in the set of possible intensions corresponding to category B with respect to A,I, and J. This Montague achieves by giving rules for expressing the functions or function associated with a non-basic phrase α of any category, in terms of the functions associated with the basic phrases from which α is ultimately derived with the help of the syntactic rules. The function associated with a non-basic phrase α is computed in a parallel manner in which α is syntactically derived in the sense that for every syntactic rule there is a corresponding semantic rule, which, applied to the functions associated with the phrases, from which α was derived by using the syntactic rule in question, gives the function associated with α. The rules for computing the $\alpha^{\mathcal{A}g}$:s (the intension(s) of α with respect to $\mathcal{A}$ and g or the function(s) associated with α relative to $\mathcal{A}$ and g) when α is any phrase of any category, are as follows:

T1 If $\alpha \in BP$, then $\alpha^{\mathcal{A}g} = F(\alpha)$

T2 If $\delta \in P_{Cn}$, then:

(a) <u>every</u> $\delta \in P_T$, and <u>every</u> $\delta^{\mathcal{A}g}$ is the function such that for any i, j, P, <u>every</u> $\delta^{\mathcal{A}ijg}(P) = 1$ iff for all x, if $\delta^{\mathcal{A}ijg}(x) = 1$, then $P(i,j)(x) = 1$

(b) <u>the</u> $\delta \in P_T$, and <u>the</u> $\delta^{\mathcal{A}g}$ is a function such that for any i, j, P, <u>the</u> $\delta^{\mathcal{A}g}(P) = 1$ iff there is exactly one x such that $\delta^{\mathcal{A}ijg}(x) = 1$, and $P(i,j)(x) = 1$

(c) <u>a(n)</u> $\delta \in P_T$, and <u>a(n)</u> $\delta^{\mathcal{A}g}$ is the function such that for any i, j, P, <u>a(n)</u> $\delta^{\mathcal{A}ijg}(P) = 1$ iff there exists at least one x such that $\delta^{\mathcal{A}ijg}(x) = 1$, and $P(i,j)(x) = 1$

T3 If $\delta \in P_{Cn}$, $\phi \in P_t$, and $\alpha \in P_{Cn}$ is the result of applying the syntactic rule corresponding to T3 involving he_n or him_n to δ and ϕ, then $\alpha^{\mathcal{A}g}$ is the P such that for any i, j, x, $P(i,j)(x) = 1$ iff $\delta^{\mathcal{A}ijg'}(x) = 1$, and $\phi^{\mathcal{A}ijg'} = 1$ where $g'(x_n)$ is x, and g' otherwise agrees with g.

T4 If $\alpha \in P_T$, $\delta \in P_{IV}$, and $\gamma \in P_t$ is the result of applying the syntactic rule corresponding to T4 to α and δ, then $\gamma^{\mathcal{M}ijg} = \alpha^{\mathcal{M}ijg}(\delta^{\mathcal{M}ijg})$

T5 If $\delta \in P_{TV}$, $\beta \in P_T$, and $\gamma \in P_{IV}$ is the result of applying the syntactic rule corresponding to T5 to δ and β, then $\gamma^{\mathcal{M}ijg} = \delta^{\mathcal{M}ijg}(\beta^{\mathcal{M}ijg})$

T6 If $\delta \in P_{IAV/T}$, $\beta \in P_T$, and $\gamma \in P_{IAV}$ is the result of applying the syntactic rule corresponding to T6 to δ and β, then $\gamma^{\mathcal{M}ijg} = \delta^{\mathcal{M}ijg}(\beta^{\mathcal{M}ijg})$

T7 If $\delta \in P_{IV/t}$, and $\beta \in P_t$, then $\delta\beta \in P_{IV}$, and $\delta\beta^{\mathcal{M}ijg} = \delta^{\mathcal{M}ijg}(\beta^{\mathcal{M}ijg})$

T8 If $\delta \in P_{IV//IV}$, and $\beta \in P_{IV}$, then $\delta\beta \in P_{IV}$, and $\delta\beta^{\mathcal{M}ijg} = \delta^{\mathcal{M}ijg}(\beta^{\mathcal{M}ijg})$

T9 If $\delta \in P_{t/t}$, and $\beta \in P_t$, then $\delta\beta \in P_t$, and $\delta\beta^{\mathcal{M}ijg} = \delta^{\mathcal{M}ijg}(\beta^{\mathcal{M}ijg})$

T10 If $\delta \in P_{IV/IV}$, and $\beta \in P_{IV}$, then $\beta\delta \in P_{IV}$, and $\beta\delta^{\mathcal{M}ijg} = \delta^{\mathcal{M}ijg}(\beta^{\mathcal{M}ijg})$

T11 If $\phi, \psi \in P_t$, then

(a) ϕ and $\psi \in P_t$, and ϕ and $\psi^{\mathcal{M}ijg} = 1$ iff $\phi^{\mathcal{M}ijg} = 1$, and $\psi^{\mathcal{M}ijg} = 1$

(b) ϕ or $\psi \in P_t$, and ϕ or $\psi^{\mathcal{M}ijg} = 1$ iff $\phi^{\mathcal{M}ijg} = 1$, or $\psi^{\mathcal{M}ijg} = 1$

T12 If $\gamma, \delta \in P_{IV}$, then

(a) γ and $\delta \in P_{IV}$, and γ and $\delta^{\mathcal{M}ijg}(x) = 1$ iff $\gamma^{\mathcal{M}ijg}(x) = 1$, and $\delta^{\mathcal{M}ijg}(x) = 1$

(b) γ or $\delta \in P_{IV}$, and γ or $\delta^{\mathcal{M}ijg}(x) = 1$ iff $\gamma^{\mathcal{M}ijg}(x) = 1$, or $\delta^{\mathcal{M}ijg}(x) = 1$

T13 If $\alpha, \beta \in P_T$, then α or $\beta \in P_T$, and α or $\beta^{\mathcal{M}ijg}(P) = 1$ iff $\alpha^{\mathcal{M}ijg}(P) = 1$, or $\beta^{\mathcal{M}ijg}(P) = 1$

T14 If $\alpha \in P_T$, $\phi \in P_t$, and $\psi \in P_t$ is the result of applying the syntactic rule corresponding to T14 involving he_n or him_n to α and ϕ, then $\psi^{\mathcal{M}ijg} = \alpha^{\mathcal{M}ijg}(P)$ where P is such that for any i', j', x, $P(i',j')(x) = 1$ iff $\phi^{\mathcal{M}i'j'g'} = 1$ where $g'(x_n)$ is x, and g' otherwise agrees with g.

T15 If $\alpha \in P_T$; $\beta \in P_{Cn}$; and $\beta \in P_{Cn}$ is the result of applying the syntactic rule corresponding to T15 involving he_n or him_n to α and β, then $\beta^{\mathcal{A}ijg}$ is the P such that for any i, j, y, $P(i,j)(y)=1$ iff $\alpha^{\mathcal{A}ijg}(Q)=1$ where Q is such that for any i', j', x, $Q(i',j')(x)=1$ iff $\beta^{\mathcal{A}i'jig'}(y)=1$ where $g'(x_n)$ is x, and g' otherwise agrees with g

T16 is almost identical with T15; that is, we get T16 only by substituting P_{IV} for P_{Cn} in T15

T17 If $\alpha \in P_T$; $\delta \in P_{IV}$; and β is the result of applying operations F_{11}, F_{12}, F_{13}, F_{14}, and F_{15} of the corresponding syntactic rule S16 to α and δ, then

$\beta^{\mathcal{A}ijg}=1$ iff $\alpha^{\mathcal{A}ijg}(\delta^{\mathcal{A}ig})=0$

$\beta^{\mathcal{A}ijg}=1$ iff there is a j' j such that $\alpha^{\mathcal{A}ij'g}(\delta^{\mathcal{A}ig})=1$

$\beta^{\mathcal{A}ijg}=1$ iff for all j' j, $\alpha^{\mathcal{A}ij'g}(\delta^{\mathcal{A}ig})=0$

$\beta^{\mathcal{A}ijg}=1$ iff there is a j' j such that $\alpha^{\mathcal{A}ij'g}(\delta^{\mathcal{A}ig})=1$

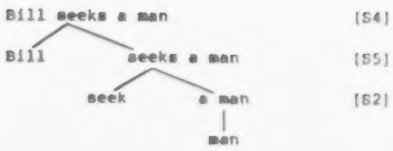
$\beta^{\mathcal{A}ijg}=1$ iff for all j' j, $\alpha^{\mathcal{A}ijg}(\delta^{\mathcal{A}ig})=0$,

respectively.

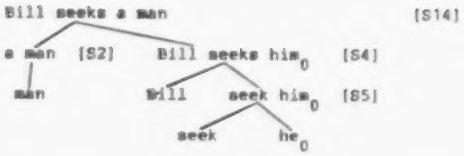
As can be seen, many of the semantic rules above have been formulated in such a manner that they contain the corresponding syntactic rule. It may also be mentioned that from the syntactic rule defining the fragment and the semantic rules defined for it, it follows that for $\alpha^{\mathcal{A}ig}$ to be more than one function it is necessary that α is syntactically derivable in more than one way.

Before continuing, we give an example which shows how Bill seeks a man$^{\mathcal{A}ig}$ is computed on the basis of, or expressed in terms of, the intensions of the basic phrases from which its syntactic derivation starts. We pay attention only to three different derivations of this phrase of category t which, like all phrases of this category, has infinitely many derivations. The following three trees indicate in a lucid manner how the phrase in question can be constructed. The phrase attached to a node in a tree is shown to be formed from phrases immediately below it and after any derived phrase the syntactic rule used in its derivation is mentioned.

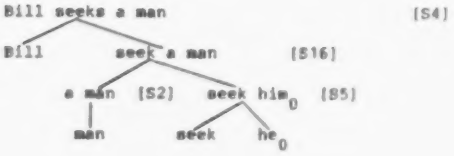
Derivation 1.



Derivation 2.



Derivation 3.



When Bill seeks a man is formed as indicated in derivation 1, Bill seeks a man^{M,i,j,g} =1 iff Bill^{M,i,j,g} (seeks a man)^{M,g} = 1 (T4) iff F(Bill) (i,j)(Q)=1(T1) iff Q(i,j)(b)=1 (the definition of F(Bill)) where Q is such that for any i',j', Q (i',j') (y)=1 iff seek$^{M,i',j',g}$ (a man) (y)=1(T5) iff F(seek) (i',j') (W) (y) =1 where W is such that for any i",j", W(i",j") (P)=1 iff there exists at least one x such that F(man) (i",j") (x)=1 and P(i",j")(x)= 1 (T1 and T2).

This simplifies to Bill seeks a man^{M,i,j,g}= 1 iff F(seek)(i,j) (W)(b)=1 where W is such that for any i',j', W(i',j')(P)=1 iff there exists at least one x such that F(man) (i',j')(x)=1 and P(i',j')(x)=1.-- Thus, Bill seeks a man^{M,g} is the p such that for any i,j,p(i,j)=1 iff (the statement

to the right of Bill seeks a man$^{\mathcal{A}ijg}$ above).

When the phrase in question is constructed according to derivation 2, Bill seeks a man$^{\mathcal{A}ijg}$ =1 iff a man$^{\mathcal{A}ijg}$ (P) =1 (T14) where P is such that for any i',j',x, P(i',j') (x)=1 iff Bill seeks him$_0^{\mathcal{A}i'j'g'}$ =1 iff Bill$^{\mathcal{A}i'j'g'}$ (seek him)$^{\mathcal{A}g'}$ =1 (T4) iff F(Bill) (i',j')(Q)=1 (T1) iff Q (i',j') (b)=1 (def. of F(Bill)) where Q is such that for any i",j",x, Q(i",j") (y)=1 iff seek$^{\mathcal{A}i''j''g'}$ (he$_0^{\mathcal{A}g'}$) (y) =1(T5) iff F (seek) (i",j") F (he$_0$) (y) =1 (T1) where F(he$_0$) is such that for any i"',j"',P', F(he$_0$) (i"',j"') (P')=1 iff P'(i"',j"') (g'(x_0)=1 (definition of F(he$_0$)) and where g'(x_0) is x, and g' otherwise agrees with g. Using T2 and otherwise simplifying the right side we get Bill seeks a man$^{\mathcal{A}ijg}$=1 iff there exists at least one x such F(man) (i,j) (x)=1 and F(seek) (i,j) F(he$_0$) (b) =1 where F(he$_0$)is such that for any i',j',P, F (he$_0$) (i',j') (P)=1 iff P(i',j') (x)=1.-- Thus Bill seeks a man$^{\mathcal{A}g}$ is the p such that for any i,j, p(i,j) = 1 iff (the statement to the right of Bill seeks a man$^{\mathcal{A}ijg}$ above).

If our phrase is formed according to derivation 3, Bill seeks a man$^{\mathcal{A}ijg}$ =1 iff Bill$^{\mathcal{A}ijg}$ (seek a man$^{\mathcal{A}g}$) =1 (T4) iff F(Bill)(i,j) (Q)=1 (T1) iff Q(i,j)(b)=1 (def. of F(Bill)) where Q is such that for any i',j',x, Q(i',j') (y)=1 iff a man$^{\mathcal{A}i'j'g}$ (P)=1 where P is such that for any i",j",x, P(i",j") (x)=1 iff seek him$_0^{\mathcal{A}i''j''g'}$ (y)=1 (T16) iff seek$^{\mathcal{A}i''j''g'}$ (he$_0^{\mathcal{A}g'}$)(y)=1(T5) iff F(seek) (i",j")F(he$_0$)(y)=1 where F(he$_0$) is such that for any i"',j"',P', F (he$_0$) (i"',j"') (P')=1 iff P'(i"',j"') (g'(x_0)=1 and where g'(x_0) is x, and g' otherwise agrees with g. Using T2 and simplifying the right side we get the same result as in the second case.

It should be noted that Bill seeks a man$^{\mathcal{A}g}$ in each case above is the same irrespective of whether he$_{i(i\neq o)}$ is used instead of he$_0$ in the syntactic derivations. The infinity of P_B for certain categories B is indeed due to the possibility of using alternatively different he$_i$ in the infinite set {he$_0$,he$_1$,he$_2$...} in the way indicated.

Montague introduces what we would like to call a natural model for the defined fragment of English. Any intensional model $\mathcal{A}$ = ⟨A,I,J,jo,m,b, n ≤ F⟩ for the defined fragment of English is a natural model for that fragment iff the following conditions hold for $\mathcal{A}$:

(I) There is at least one u such that for all i,j,u=jo(i,j)
There is ... " u=m(i,j)
There is ... " u=b(i,j)
There is ... " u=n(i,j)

(II) For all x,i, and j, if F(δ) (i,j)(x)=1 where $\delta \in$ {man, woman, park, fish, pen, unicorn} then there exists at least one u such that for all i'

and j', u=x(i',j').

(III) There exists at least one M such that for all x,i, and j, $F(\delta)(i,j)(x)=1$ where $\delta \in \{$run, walk, talk$\}$ iff $M(i,j)(x(i,j))=1$

(IV) There exists at least one S such that for all x,W,i, and j, $F(\delta)(i,j)(W)(x)=1$ where $\delta \in \{$find, lose, eat, love, date, be$\}$ iff $W(i,j)(P)=1$ where P is such that for all i',j', and y, $P(i',j')(y)=1$ iff $S(i',j')(y(i',j'))(x(i',j'))=1$

(V) For all W there exists at least one M such that for all x,i, and j, $F(\delta)(i,j)(W)(x)=1$ where $\delta \in \{$seek, conceive$\}$ iff $M(i,j)(x(i,j))=1$

(VI) For all p there exists at least one M such that for all x, i, and j, $F(\delta)(i,j)(p)(x)=1$ where $\delta \in B_{IV/t}$ iff $M(i,j)(x(i,j))=1$

(VII) For all P there exists at least one M such that for all x,i, and j, $F(\delta)(i,j)(P)(x)=1$ where $\delta \in B_{IV//IV}$ iff $M(i,j)(x(i,j))=1$

(VIII) There exists a G such that for all W,Q,x,i,and j, $F(\delta)(i,j)(W)(Q)(x)=1$ where δ is in iff $W(i,j)(P)=1$ where P is such that for all i',j', and y, $P(i',j')(y)=1$ iff $G(i',j')(y(i',j'))(Q)(x)=1$

(IX) For all W,x,i, and j, $F(\text{seek})(i,j)(W)(x)=1$ iff $F(\text{try to})(i,j)(Q)(x)=1$ where Q is such that for all i',j', and y, $Q(i',j')(y)=1$ iff $F(\text{find})(i',j)(W)(y)=1$.

If $\alpha^{\wedge}$ or the $\alpha^{\wedge}$:s is, or are, intended to be equivalents of some sort to the meaning or meanings of α, it is strange that the condition that F is a one-one function is not included among the conditions defining a natural model for the fragment. It is strange because if this condition is not imposed we may chose an F such that of any α and β in PB_B of any B, which all or almost all native speakers of English find to be non-synonymous phrases of their mother tongue, is predicted $F(\alpha)=\alpha^{\wedge}=F(\beta)=\beta^{\wedge}$. On the other hand, it should be noted that if Montague's aim in PTQ is what we later speculate it is, this condition is not needed. It should be observed that the principles (I)-(IX) cannot be given any literal intuitive natural interpretation even if A,I, and J are interpreted as the set of possible things, the set of possible worlds, and the set of moments of time, respectively, because it does not make sense to say that the extension of any basic phrase mentioned in the principles is a set of functions. For example, it is meaningless or false to say that man, pen, run(s), walk(s) etc. are in English predicated of functions x in $A^{I\times J}$. These expressions are in fact predicated of things which most probably correspond to the elements in A. We, however, do not think that Montague intended these principles to have any literal intuitive meaning, but that he only postulated them as theoretical, non-intuitive principles in order

to achieve certain desirable ends. (Later we shall comment more extensively on these principles.)

After presenting his principles, Montague defines certain important concepts. We now give these definitions, but we name the concepts differently. In the definitions below we assume that ϕ and ψ are phrases of category t and that the $\mathcal{A}$:s are natural models for the fragment.

- ϕ is 1-valued with respect to $\mathcal{A}ij$ iff $\phi^{\mathcal{A}ijg} = 1$ for every $\mathcal{A}$-assignment g.
- ϕ is necessarily 1-valued iff ϕ is 1-valued with respect to $\mathcal{A}ij$ for all $\mathcal{A}$, i, and j.
- A set $A \subseteq P_t$ implies the value of ψ iff for all $\mathcal{A}ij$, if every $\phi \in A$ is 1-valued with respect to $\mathcal{A}ij$, then ψ is 1-valued with respect to $\mathcal{A}ij$.
- The value of ϕ is necessarily equivalent with the value of ψ iff $\{\phi\}$ implies the value of ψ and vice versa.

2. The aim of PTQ

P_t includes elements of which many competent native speakers of English would truly predicate the following intuitions: "is an ambiguous sentence in the sense of having a de re (= referential, specific) and a de dicto (= non-referential, non specific) meaning", "is a non-ambiguous sentence in the sense of not having these two meanings", "is a sentence true by its meaning only", and "are cognitively synonymous sentences". P_t also contains elements from which could be constructed entities of which many competent native speakers of English would truly predicate the intuition "is a valid argument" or "is not a valid argument".

In PTQ "ϕ has a de re meaning" probably means "ϕ contains at least one phrase $a(n)\beta$, where β is in P_{Cn}, and at least one meaning of ϕ is such that the truth of ϕ with respect to that meaning at any given time i in the actual world implies the truth of "there exists a(n) β at time i in the actual world". The meaning of "ϕ has a de dicto meaning" in PTQ we presumably arrive at by replacing "implies" above, by "does not imply".

According to Montague, for example, any element in P_t of the form α seeks a β or of the form α tries to find a β, where α is in P_T and β in P_{Cn} is ambiguous (henceforth we use the word 'ambiguous' to refer to the kind of ambiguity introduced). On the other hand, no element in P_t of the form $\alpha\ \gamma\ a\ \beta$ where α and β are as above, and γ is in { finds, loses, eats, loves, dates, is } has this ambiguity according to Montague. Also,

John talks about a unicorn, John wishes to find a unicorn, a woman loves every man, and Mary believes that John finds a unicorn and he eats it are ambiguous according to Montague, but not John seeks a unicorn and Mary seeks it, John tries to find a unicorn and wishes to eat it, John wishes to find a unicorn and tries to eat it. Of course, given any of the sentences (with/or without the ambiguity) just listed, many other sentences in P_t of the same form (with/or without the ambiguity) could be constructed, by defining "being of the same form" in the proper way.

Montague does not explicitly mention any element in P_t which is true by its meaning only. As an example of this kind of sentence, John walks or John does not walk could perhaps be mentioned. As examples of synonymous elements in P_t only pairs of the form α seeks β, α tries to find β, where α and β are in P_T, are mentioned in PTQ.

An argument is an ordered pair the first member of which is a set of sentences (the premises), and the second element of which is exactly one sentence (the conclusion). For example, $\langle \{$ John loves a pen and Bill walks $\}$, Bill walks $\rangle$ both sentences of which are in P_t, is an argument with exactly one premise. This argument is furthermore a valid argument (equivalently the conclusion is a logical consequence of the premises), since the truth of all the premises imply the truth of the conclusion, which is the defining property of the concept of a valid argument (or equivalently of the relation of logical consequence). Montague does not, however, explicitly mention this or any other valid argument consisting of elements in P_t. He only mentions explicitly some non-valid arguments (= arguments which are not valid) consisting of elements in P_t: $\langle \{$ the temperature is ninety, the temperature rises $\}$, ninety rises $\rangle$ and $\langle \{$ a price rises, every price is a number $\}$, a number rises $\rangle$.

We now think that the principal aim of Montague in PTQ is to account for the competent native English speaker's intuitions of the earlier mentioned type, in the sense of providing a device which simulates the competent native English speaker's behavior with respect to the sentences and arguments (or at least some explicitly mentioned sentences and arguments) in the fragment, when this behavior is restricted to the intuitions of the type mentioned. More precisely, we think that Montague wants to present a device which says of a sentence, of a pair of sentences, and of an argument, "is/is not ambiguous" "is/is not true by its meaning only", "are/are not synonymous", and "is/is not a valid argument", respectively, iff the native speaker predicates the same thing of that sentence, pair of sentences and argument, respectively. We think that the

principle reason for generating the fragment in the way it is done and for introducing exactly those semantic rules and semantic postulates presented in PTQ, is that all these things together are one way of achieving the desired end. This, however, is only true if certain conventions are agreed upon, which Montague has left unstated, probably because he considered them obvious. The first convention is

(a) ϕ containing $a(n)\beta$ where $\beta \in P_{Cn}$, is ambiguous iff there are two ϕ's such that the definition of one implies "for any i,j there exists at least one x such that $F(\beta)(i,j)(x)=1$", and the definition of the other does not imply this. The ϕ' which implies this, corresponds to the de re meaning and the other to the de dicto meaning. (It should be noted that nothing in this convention depends on which natural model $\mathcal{A}$ is selected.)

Our example sentence in section 1, Bill seeks a man, is intuitively ambiguous and, as expected, Montague's simulating device predicts this property when the convention is adopted. In this example none of the semantic postulates are needed for successful simulation. Consider now the sentences Bill finds a pen and Bill talks in a park which both intuitively have only the de re meaning. Without using postulate (IV) and postulate (VIII) the device would, however, predict these and many other sentences to be ambiguous. We have not systematically checked for every sentence S in the fragment whether the device predicts of S what it should with respect to the ambiguity or non-ambiguity of S. By checking almost at random we have observed, however, that according to the device, for example, John tries to find a unicorn and wishes to eat it and John wishes to find a unicorn and tries to eat it[1] are ambiguous although for Montague intuitively they only have the de re meaning. The other conventions are

(b) ϕ is true by its meaning only iff ϕ is necessarily 1-valued

(c) $\langle A, \phi \rangle$ is a valid argument ($=\phi$ is a logical consequence of A) iff A implies the value of ϕ.

(d) ϕ and ψ are synonymous iff the value of ϕ is necessarily equivalent with the value of ψ.

Montague explicitly lists and discusses many ambiguous sentences. He

[1] Actually these sentences cannot be derived in the fragment although explicitly mentioned by Montague. However, with a slight reformulation of S4 which does not affect the corresponding semantic rule they could be derived.

mentions, however, only two arguments which intuitively according to him are invalid. No intuitively valid arguments are explicitly mentioned or discussed. Furthermore, only pairs of intuitively synonymous sentences of the type α seeks β , α tries to find β where α and β are in P_T, are mentioned. Because of this inexplicitness it is very hard to decide what postulates are needed for succesful prediction of these intuitions. The obvious exception is postulate (IX) which is needed for succesful simulation of synonymity of the type above. For example, no postulate is needed to predict the non-validness of the only two arguments explicitly treated by Montague. Perhaps, however, there are sentences or arguments in the fragment the intuitive properties of which could not be adequately predicted without postulates (I), (II), (III), (V), (VI), and (VII). On the other hand, there might be some other reason for introducing these postulates. To understand this reason we must present a feature of Montague's treatment of the fragment which we have left untouched until now. Montague does not directly associate functions with phrases in the way it has been described here, but does this indirectly through an intensional logic. The phrases of the fragment are in Montague's treatment "translated" to expressions or formulas of that logic, to which the functions are directly assigned, and by the translation relation they are then indirectly assigned to the phrases of the fragment. Now, it might be that certain of the postulates are needed only for the following purpose: every meaning of every sentence of the fragment should have at least one translation in the intensional logic which resembles as much as possible the translation of the meanings of this sentence into ordinary predicate logic (=extensional logic) (if the sentence has such translations), and which assigns the sentence the same functions as the other translations into intensional logic. Consider, for example, the following simple sentence Bill finds a pen which has at least the following three translations into intensional logic:

$$b^{\circ}(\hat{}\underline{find}(\hat{}\lambda P\forall x[\underline{pen}(x)\wedge[\check{}P](x)]))$$

$$\lambda P\forall x[\underline{pen}(x)\wedge[\check{}P](x)](\hat{}\lambda x_0[b^{\circ}(\hat{}\underline{find}(\hat{}\lambda P[[\check{}P](x_0)]))$$

$$b^{\circ}(\hat{}\lambda y[\lambda P\forall x[\underline{pen}(x)\wedge[\check{}P](x)](\hat{}\lambda x_0[[\underline{find}(\hat{}\lambda P[\check{}P(x_0)])(y)])])$$

Each of these has associated with it the same function, as can be proved using postulate (IV). Now, using postulates (I), (II), and (IV), it can be proved that

$$\forall u[\underline{pen}_{\circ}(u)\wedge\underline{find}_{\circ}(b,u)]$$

(which is a formula in the intensional logic and very much resembles the formula in ordinary predicate logic to which the extensional sentence is normally translated) has the same function associated with it as the three formulas above. But why would Montague want this resemblance between a formula of his intensional logic (which translates a sentence in the fragment), and a formula of predicate logic normally representing this sentence? Perhaps because these formulas are simpler and therefore easier to work with and every person working in intensional logic knows predicate logic. Another reason might be that Montague was anxious to show the reasonableness of his complicated intensional logic by indicating that this logic gives almost the same logical representations of the extensional meanings of the sentences in the fragment, as predicate logic. It is of course possible that some postulates are introduced neither for the purpose of adequate simulation nor for the purposes just discussed. In that case the introduction of such postulates can only have an intuitive justification of some sort, that is, they are rigorous equivalents of some statements that appear to be intuitively true. The most reasonable candidates for this role are postulates (V)-(VII). Intuitively they seem to say the following:

(a) The truth value at time i in the actual world of any sentence of the form $\alpha\beta\gamma$ where α and γ are in P_T and β is seeks or conceives, depends only on what α refers to at time i in the actual world.

(b) The truth value at time i in the actual world of any sentence of the form $\alpha\beta\gamma$ where α is in P_T, and γ is in P_t, and β is asserts that or believes that, depends only on what α refers to at time i in the actual world.

(c) The truth value at time i in the actual world of any sentence of the form $\alpha\beta\gamma$ where α is in P_T, γ is in P_{IV}, and β is tries to or wishes to, depends only on what α refers to at time i in the actual world.

3. Main conclusion

The Montague grammar in PTQ is very interesting, (a) because it successfully simulates certain intuitions of the native speakers of English concerning the sentences and arguments in the fragment of English in PTQ, and (b) because the intuitions are of the type that linguists of late have tried to explain.

As a simulating device the grammar in PTQ is, however, purely ad hoc, and therefore cannot e x p l a i n , at least not in any normal sense, the intuitions which it is concerned with.

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SECTION II:

TEXTUAL

COHESION

But she could not even get her head through the doorway; 'and even if my head would go through,' thought poor Alice, 'it would be of little use without my shoulders.'

- L. Carroll.

INTRODUCTION:

TEXT, COHESION, AND COHERENCE

When the layman thinks about language, he usually thinks about the concrete manifestations in terms of sounds or, to an even higher extent, of written letters following one another. He seldom stops to think about what really goes on in our minds before and during a particular act of producing or understanding a message, or, as it will be called here, a t e x t.

First, a few words about the concept 'text'. Theoretically, I think one can distinguish between a structural and a functional definition of 'text'. In a purely structural view, a text can be seen as a concatenation of sentences, as $S(+S)^n$, where $n \geq 1$. According to this definition you need a minimum of two sentences to form a text; however, depending on the definition of S, this is probably not a sufficient condition for something to be called a text. This structural view of texts, and of language in general for that matter, can be seen in a somewhat extreme sense in the following quotation:[1]

> Every language, whether it be English, French, Russian, Italian, Chinese, or any other language spoken anywhere in the world, is nothing more than a collection of sentences.

The other way to view a text is to see it as a functional unit. This view can be illustrated by a quotation from Halliday & Hasan:[2]

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[1] Jacobs, R.A. & Rosenbaum, P.S. (1970) An Introduction to Transformational Grammar. Grammar 1. Boston, Mass.: Ginn & Co. iv.

[2] Halliday, M.A.K. & Hasan, R. (1976) Cohesion in English. London: Longman. 1-2.

> A text is a unit of language in use. ... it is not defined by its size. ... A text is not something that is like a sentence, only bigger, it is something that differs from a sentence in kind.

A functional view of 'text' in a sense includes the structural definition of it; but a functional text is more like an utterance in that it can merely consist -- structurally -- of one S, or even one phrase or word. (Whether such phrases or words should be seen as elliptical is not a functional, but a structural question.) Also, a functional text is more of a communicative unit in language.

In a sense connected with these different ways of defining texts is a useful theoretical distinction between the c o h e s i o n of a text, and its c o h e r e n c e .

In the Text Linguistics Research Group this terminological dichotomy has been used in the following way: 'coherence' stands for all kinds of "semantico-functional" phenomena which collaborate to give as output a functionally acceptable and adequate text. In other words, coherence is indicative and characteristic of texts in general: a sequence of sentences is not regarded by a native speaker as a text proper unless it possesses this kind of functional sense of "tightness".

'Cohesion', on the other hand, is the term we use only for denoting the kind of textual tightness which is manifested by morpho-syntactic, lexical-similarity, and/or "metrical" means (in a word, structural means) at the level of SS.

This distinction is, of course, basically theoretical, and the two kinds of textual tightness will be hard to separate in each and every particular textual occurrence. But, as N.E. Enkvist shows in his article 'Coherence, Pseudo-Coherence, and Non-Coherence', these two concepts do not imply one another: we can have (explicitly) cohesive texts which are not coherent, and vice versa. And, in fact, coherent texts which also manifest surface cohesion represent only special cases of textual tightness.

Sentences which are cohesive on the surface, but which do not combine to produce an adequate textual and functional coherence, can -- in this terminology -- be called p s e u d o - c o h e r e n t ; and where it is found necessary to draw a distinction between non-cohesive coherent texts, and coherent texts with cohesive manifestations, we have called the former p r a g m a t i c a l l y c o h e r e n t .

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Concepts like 'given/old - new', 'theme - rheme', 'topic - comment', 'presupposition - focus', etc. are well-known in linguistics by now. In attempts to arrive at an adequate description of text-linguistic phenomena, there have been extensive discussions of the extent to which we need several of these dichotomies (or trichotomies, for that matter) superimposed on one another; whether these dichotomies should be defined at the surface structure, or at some underlying structure; what different roles these concepts play in different types of languages (e.g. English and Czech); to what extent these concepts can (or rather, cannot) be explained and tied down into logical formulae; to what extent such dichotomies are valid on other than a clausal (e.g. a phrasal) level; to what extent they influence the syntactic and semantic description of a language, etc., etc.

Text linguists, or discourse analysists, have in recent years not merely restricted themselves to making explicit the textual structure of a verbal message, but they have also made important contributions towards understanding the psychological devices underlying verbal outputs.

By and large, coherence of texts, I feel, should be thought of in very broad terms, as constituting some kind of 'rational totality' which the speaker tries to transmit -- for one reason or another -- to a listener. In order to get the message across, it is not enough for the speaker to be able to envisage this 'rational totality' in his own mind; he also has to try and dress it into a verbal message which will enable the listener to construct as closely identical a picture as possible of the speaker's underlying message via the verbal signs. Such an attempt of its result will rely a great deal on the mutual understanding between the participants in the communicative situation: shared presuppositions, the particular context-of-situation, their attitudes to one another, etc.

It is well-known that people do not reject an odd-looking text offhand, but that they try as far as possible to impose a possible interpretation of the text as part of a rational, or even a fictitious world. One way to describe one's perception of a text is to say that it is a reverse process of one's production of texts. This is also perhaps the most economical route of description, both from the point of view of the working of the brain/mind, and from the point of view of the linguist's requirements on his theory.

From the productional point of view we can speculate that something like the following takes place before the actual uttering of a verbal message: first we single out a referent or the like which we want to focus

our interests upon -- in Fillmorean[3] terms, we decide in what perspective to view, or in what perspective we want to make the addressee view the message. Often we make this 'centre of interest' the first constituent in the morpho-syntactic clause. At the same time this centre of interest is usually known to the addressee, and we have come to call it the 'theme', or the old/given information in a clause.

When we have chosen a particular perspective in terms of singling out a 'theme', from which we want to view a situation, we are then faced with how to say what we intended to say about this 'theme'; we are faced with the 'predicating process', namely, the act of choosing an appropriate complement to the theme. From a lexico-syntactic point of view we can say that a verb (i.e. the 'heaviest' part of the complement) is the most determinant element in a clause (as e.g. Fillmore and dependency grammarians have argued). But, as I have suggested above, our centre of 'thematic' interest can be said to be prior to choosing a verb, because it predisposes our choice of verb.

To take a watered-down example: if you have a business transaction to communicate, you first choose the perspective from which you want to view it: the point of view of the seller, the buyer, the goods, or the money. Say, e.g., that you choose the buyer's perspective. When you have chosen this you are automatically predisposed to make your next choice among a certain class of verbs: namely those which describe the action in terms of having the centre-of-interest actor first in the clause. In this case you normally would choose buy as your verb. This, of course, implies un unmarked situation. We may for other -- perhaps strictly formal -- reasons want to thematize or topicalize[4], say, the object, but still use the verb buy. This can be done by passivization, and a change in word order, respectively:

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[3] Cf. e.g. Fillmore, C.J. (1977) The Case for Case Reopened. In Cole, P. & Sadock, J.M. (eds) Syntax and Semantics 8: Grammatical Relations. New York, etc.: Academic Press. 59-82.

[4] On structural grounds we can make a distinction between 'thematizations', "arrangements of the sentence which change the linear ordering by changing grammatical surface relations", and 'topicalizations', which "move elements without affecting their grammatical relations". Enkvist, N.E. (1977) Contextual Acceptability and Error Evaluation. In Palmberg, R. & Ringbom, H. (eds) Contrastive Linguistics and Error Analysis. Åbo: The Research Institute of the Åbo Akademi Foundation. 1-26. Quote from p. 3.

(1) Charles bought a car.
(2) A car was bought by Charles.
(3) A car Charles bought.

In cases where we do not have different verbs for the different perspectives we choose between, thematizations and topicalizations are themselves the chief means of indicating one's choice of perspective.

From this point of view we can then say that thematizations are surface reflections of one's choice of perspective.[5] This whole concept of underlying 'perspective', furthermore, seems to be a very determinant factor in attributing functional coherence to a text. It is, as it were, the "cause" (or one of the causes) for the rational-totality output.

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Finally, I shall pose a series of questions, the answers to which I feel are of utmost interest and importance for future studies in the field.

A strictly functional definition of texts implies that we will have difficulty in deciding when one text ends and another begins. Or as Halliday has put it, "peaks of texture alternate with troughs"[6]. In this light, to what extent is a 'text' to be understood as the 'coherence-of-a-text'?, and/or coherence itself as a "peak" of texture?

To what extent are concepts like 'theme' and 'rheme' applicable on a 'higher' level? Can we talk about long stretches of language material as having themes and rhemes, and, then, about 'paragraphs' and sentences as having sub-, and sub-sub-themes, respectively? What bearing would this have on the coherence of texts in general?

What is the relative importance of new and old information, respectively, for a text to be considered adequately coherent? That is, will a text with 90 % new information be considered as coherent as one with only 10 % new information?

This question links up with the interrelation between coherence and redundancy: to what extent can we say that a 'non-redundant' text is

[5] As the reader will have noticed, I have here overlooked the differences between theme-rheme, given-new, etc.

[6] Halliday, M.A.K. Text as Semantic Choice in Social Contexts. Forthcoming in van Dijk, T. & Petöfi, J. (eds) Grammars and Descriptions. Berlin. Referred to in Ellis, J. (1976) The Role of the Concept of Text in the Elaboration of Linguistic Data. York Papers in Linguistics 6. 91-107.

coherent? Is there such a thing as a functionally adequate, but non-redundant text? In a more general sense, redundancy may be t h e phenomenon without which no coherence can exist; also, if the redundancy is not 'there' in the verbal message, we will be apt to supply it ourselves. -- And as for 'redundancy' itself, to what extent has normative language teaching and logical frameworks imposed on language influenced our sense of what is acceptable redundancy, and what are unacceptable, 'performative' errors of redundancy?

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The importance of overt cohesion has been somewhat by-passed in this Introduction. To remedy this neglect, I shall here just mention one final point.

It has often been noted -- and also experimentally shown -- that people teaching their mother-tongue as a foreign language are more likely to assess the knowings and learnings of their pupils not so much on the basis of the detailed correctness of the structure of the language produced, but on the basis of the coherence, the cohesion, and their general impression of the product-text. In the present discussion, this matter is indicative for two reasons: (a) it stresses the importance of the underlying 'tightness' of texts as against mere structural rigidity; and -- paradoxically perhaps -- (b) it typically shows the importance of overt cohesion: pupils who fail to transmit a 'rational totality' will do so, fundamentally not because they cannot construct a rational totality in their own minds, but because they do not know how to express it verbally for it to be understood a s a totality in the foreign language. This difficulty of expressing rational totalities verbally may, of course, also be present when speaking one's mother-tongue.

- *Ed.*

COHERENCE, PSEUDO-COHERENCE, AND NON-COHERENCE

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1. Introduction

1.1. In the last decade, students of text and discourse have discussed the basic requirements a string of sentences has to satisfy if it is to be accepted as a coherent text. They have usually defined overall mechanisms contributing to intersentential unity. These mechanisms regulate (a) co-reference involving identity of referent, (b) cross-reference involving referential non-identity but semantic relations in lexis, (c) information dynamics and theme-rheme-focus structure, (d) temporal reference, (e) point of view, and (f) iconic cohesion based on syntactic or phonological homomorphism. All of these areas have been intensively studied (for an overview and bibliography, see e.g. Enkvist 1975). Thus we know a great deal about anaphora, cataphora and exophora, about deixis, pronominalization and other kinds of substitution, reference, and ellipsis as coreferential and cross-referential devices. We know something about synonymy, hyponymy, hyperonymy and paronymy, about have-relations and inalienable possession, and about other semantic connections as cross-referential mechanisms. (This enables us to explain ties of coherence between Rome and The Eternal City, flower and tulip, tulip and rose, engine and sparking-plug, or ring and finger.) We can look at theme-rheme-focus structures of successive sentences and describe

the ways in which new and old information weave their paths through the text. We can set up fairly explicit rules for sequences of tenses and other temporal references that well-formed texts have to obey. And, in a less linguistic and more rhetorical or literary frame, we can comment on the unities of point of view in the text. We can also describe how recurrent, homomorphic patterns of sound, metre and syntax can add cohesion to a text. In brief: when explaining what makes coherent texts coherent we need no longer start from scratch.

1.2. By implication, one might think that a lack of such cohesive devices would lead directly to a lack of textual coherence, and vice versa that a lack of coherence would appear as an absence of explicit cohesive devices on the textual surface: if surface cohesion is a necessary condition of coherence, a lack of surface cohesion must result in non-coherence. But language does not work according to such strict implication rules, and, in practical work with concrete texts, the lack of coherence proves to be a complex phenomenon which resists analysis in surface terms alone. Actually, most studies of text linguistics have been preoccupied with the surface devices that give cohesion to a sequence of sentences. Far rarer are papers exploring the more delicate steps between coherence and non-coherence, or discussing the factors that make a text non-coherent (the best example known to me is Harweg 1975).

In this article I shall try to exemplify and discuss some of the factors that make a text non-coherent, particularly in terms of cross-referential and co-referential ties between sentences. How such factors should best be incorporated into a text model, for instance into one that generates texts out of predications and relations between predications, is a problem I shall not be concerned with here.

2. Coherence and non-coherence

2.1. To begin with, there are sentence sequences which at first blush seem to satisfy certain surface conditions of cohesion, but which our intuition nevertheless identifies as textually non-coherent. Such sequences could be called pseudo-coherent. Pseudo-coherence arises when the formal cohesive links on the textual surface fail to reflect an adequate underlying semantic coherence in terms of textuality and contextuality, as in

(1) I bought a Ford. The car in which President Wilson rode down the Champs

Elysées was black. Black English has been widely discussed. The discussions between the presidents ended last week. A week has seven days. Every day I feed my cat. Cats have four legs. The cat is on the mat. Mat has three letters.

Here the semblance of cohesion on the surface is upheld by apparent cross-references: Ford - car, black - black, discussed - discussions, and so forth. But our intuitions tell us that the text is incoherent in spite of such surface ties. On the other hand, the text

(2) George's high pass was headed to the right. The forward shot at once without dribbling and made a goal. The referee declared the kick offside.

makes perfect sense in its own context, though the cross-references that connect its sentences are far less obvious on the surface than those in (1). We might, then, say that (1) is pseudo-coherent whereas (2) is pragmatically coherent.

2.2. If our observation that there can be ties on the textual surface which do not reflect any underlying semantic coherence is right, it follows that sentences can be connected in two different ways: through surface cohesion, and through underlying semantic coherence. Different types of combination of surface cohesion and semantic coherence can be illustrated with the following four connection types:

(3) (A) Do you know John Smith? He came to see me yesterday.
(B) The half-back shot a goal. The whistle blew.
(C) Do you know John Smith? She came to see Peter.
(D) Grandmother died twenty years ago. I shall have lunch with her tomorrow.

In Text A, the semantic reference involves identity between John Smith and he, and it is correctly marked on the surface: he, a masculine pronoun, agrees with John. Here, then, both the semantic coherence and the surface cohesion are in order. In Text B, the semantic coherence is all right: we know that umpires blow whistles and half-backs shoot goals in the context of a football match. But there is no overt syntactic connective between the two sentences. The connection is thus semantic rather than syntactic: the semantic coherence is marked through lexical cross-reference between whistle

and half-back shot a goal, a cross-reference well known to football fans. In Text C, the lack of concord between John and she destroys any potential surface cohesion, and there is no semantic cross-reference between these two sentences which could tie them together. Therefore, as it stands, C is deviant as a text. (One could, however, think of wider situational and textual contexts which might add some coherence to these two sentences.) In Text D, there is syntactic agreement between grandmother and her, but the potential coreference is affected by pragmatic considerations. Our experience of the normal world tells us that we cannot have lunch with people who died twenty years ago. Therefore, if the text is to make sense, either she in fact does not refer to grandmother, or then the text refers to a world different from ours, for instance to a science-fiction or spiritist universe. This suggests that underlying semantic coherence builds on two contributing factors: proper patterns of coreference or cross-reference, and pragmatic acceptability. Full coherence presupposes that syntax, semantics, and pragmatics are in order.

To summarize, we can place Texts A, B, C, and D into a two-dimensional grid:

	coherent text	non-coherent text
Co-reference syntactically marked on the surface	A	D
Co-reference not explicitly marked on the surface	B	C

Texts of types A and B are coherent and well-formed. In the present paper I shall therefore be more interested in sentence sequences of types C and D, particularly with a view to seeing what prompts us to regard them as deviant.

2.3. Before I go on, however, I must make a note of two points which might otherwise provoke comments that I think are irrelevant for the present argument.

First, I am not implying that textual deviance is necessarily a bad thing. In absurd drama, for instance, textual deviance can be used for special effect. Just as syntactic deviance has been an important device for poets (mainly, but far from exclusively, modern ones), so textual deviance is a highly useful technique for those writers who wish to show

how difficult it is for people to understand one another.

Secondly, I am not suggesting that it is enough to discuss coherence in terms of sentence pairs, as in (1). In texts of more than two sentences, coherence patterns must of course extend beyond each pairing of two successive sentences. The general rule is that every sentence of a well-formed text must have a cross-reference to at least one other sentence of that text, and that there has to be an overall coherence involving the text as a whole. Rhetoricians and teachers have sometimes tried to formulate overall coherence rules in terms of topic sentences. Thus a text unit such as a paragraph must have a topic sentence (which can be given explicitly, or construed out of the text unit) to which every sentence of the unit must be connected, either directly or through the mediation of one or more other sentences. Several paragraphs would, in turn, cohere if they can be connected through a common topic or headline, and so forth. Such a view tallies nicely with common sense by corresponding for instance to that familiar structure where sentences form paragraphs, paragraphs sections, sections chapters, and chapters a book, and where each text unit can carry a summarizing title of its own. But as long as we cannot precisely tell when a title is capable of giving coherence to its subordinate text units, we are in the realms of abstract rhetoric rather than concrete syntax.

2.4. We are therefore closer to formal linguistics if we simply try to list some types of relations, here illustrated in terms of ties between two successive sentences, that do NOT qualify as properly cohesive ties. A rough summary classification such as that given above in Section 2.2 may here serve as a starting-point. But it should not be pressed too hard. To begin with, the borderline between syntax and semantics, and surface structures and underlying ones is drawn differently by different linguists. All of linguistic theory would need discussing to clarify such differences of opinion and linguistic climate. Then, there may be texts that resist fitting into any single one of the four slots in our grid. In the following I shall therefore list a number of instances in which the coherence between successive sentences is either non-existent or somehow impaired. In this list I shall prefer concrete exemplification under a fairly large number of fairly delicate headings to a less delicate, reductionist classification. In adapting our classification to the scrutiny of actual texts, they tend to fall into three major categories: (a) those in which there is syntactic evidence (such as lack of formal agreement in number, gender or case) of non-reference, (b) those in which there is clear pragmatic evidence of non-

coherence ('clear', that is, to those with access to the situation and the speaker's presuppositions), and (c) those in which there is neither any clear evidence of non-coherence nor any clear evidence of coherence. These categories will be exemplified in sections 3, 4, and 5 respectively. Section 6 will be somewhat in the nature of an afterthought. It will add an example of a text held together by iconic homomorphism without semantic coherence -- another type of pseudo-coherence.

3. Examples of syntactic evidence of non- coherence

3.1. Lack of formal agreement blocks a potential cross-reference

(4) Susie went to London. Peter had known him for a long time.

Susie and him disagree in gender: if we replace him with her, the text becomes coherent as such, without further contextual justification. This shows that formal agreement is not always a cumbersome device merely increasing redundancies, as Jespersen liked to suggest. Agreement on the contrary has many useful functions: it helps us to group words into constituents, it helps to trace chains of coreference and cross-reference, it blocks undesirable references, and it enables a speaker or writer to vary his word-order patterns according to certain strategies, for instance the requirements of rhythm and metre and thematic progression and emphasis. Latin poetry yields a host of examples where the opportunities of separating elements of the same constituent have been put to fine literary use.

3.2. The relation of a reference to its antecedent has to obey other rules governing anaphora and cataphora

The syntactic correctness of anaphoric or cataphoric reference is not only a matter of formal agreement as to number, gender, case, and person. Anaphoric and cataphoric references follow many other rules. Thus part of what has been called an 'anaphoric island' cannot take an anaphoric reference. 'To breed sheep' may be semantically equivalent to 'being a sheepbreeder', but compare

(5) Harry breeds sheep. He likes their smell.
(6) *Harry is a sheepbreeder. He likes their smell.

Many other relevant examples have been cited (e.g. by Grinder and Postal 1971). The tightness of certain verb-adverbial combinations can also be tested by anaphora:

(7) Susie flew to Berlin. So did I.
(8) Susie flew to Berlin yesterday. So did I this morning.
(9) *Susie flew to Berlin. So did I to London.

So did I must thus refer, not to the verb flew alone but to flew + locative. Breaches of such rules provoke a lack of well-formedness, which need not, however, result in a complete lack of interpretability: the sequences (6) and (9) would presumably be understood in spite of their deviance.

3.3. Breaches against collocational restrictions (selection rules, agreement of semantic features) block the cross-reference, unless the result is acceptable as a metaphor or as a description of a deviant universe.

(10) I have just bought a shirt. It studied at Oxford.

The verb to study collocates with human subjects, and it would be absurd to accept a literal coreference between shirt and it. Nor is there, in this instance, any obvious metaphorical interpretation. Thus if (10) is to be accepted at all, we must also accept a deviant universe running counter to our experience in that shirts can study at Oxford. Whether this kind of deviance is explained in terms of syntactic or lexical models depends on our theory and approach. As long as we operate with a model permitting explicit statements of collocational selection (for instance, a rule stating that verbs marked with the feature ⟨+human⟩ must have subjects marked with ⟨+human⟩) the deviance of (10) can be explained in overt, formal terms. This is why breaches of collocational restrictions have been mentioned here; semantically they are akin to the examples given below in section 5.

3.4. Discrepancies caused by polysemy or by homonymy block the cross-reference.

If in a text one sentence uses one member of a polysemic or homonymic set, and another sentence uses another member of the set, and if the discrepancy is evident in the text through a breach of collocational

restrictions or otherwise inferred by the recipient, the cross-reference between these set members is blocked. For instance

(11) I nailed a board tightly over the hole. {The board / It} made a wise decision.

(12) The hunter clobbered the seal. {The seal / It} was attached to the parchment with a red ribbon.

The collocations and selection rules (nail a board / the board makes decisions, clobber a seal / attach a seal with a ribbon, cf. sect. 3.3.) show that board and board, seal and seal in fact cannot be cross-referential because they represent different subsets of the polysemic or homonymic sets. And this destroys the cohesion.

3.5. The difference between referential meaning and metalinguistic meaning can weaken or block intersentential cross-reference

(13) The cat was on the mat. Mat has three letters.

In the first sentence, mat has the referential sense of 'rug', 'carpet' and refers to an object in the world of discourse. In the second sentence, however, mat is an object for metalinguistic comment, meaning 'the word "mat"'. To what extent the sentences are connected is a matter of discussion; in any case it is obvious that the discourse has shifted from the world of things to the world of words. Note that, just as in 3.3. and 3.4., the shift is signalled by collocation.

3.6. Shifts in genericity can block or weaken the reference.

In English, both the definite and the indefinite article can have a generic function: The cat / a cat is an animal, the cats / cats are animals. It is interesting to see to what extent the shift from a generic to a specific or from a specific to a generic noun phrase affects a cross-referential tie. A few examples.

(14) (a) A cat has four legs. My cat is called Peckie.
(b) My cat is called Peckie. A cat has four legs.
(c) The cat has four legs. My cat is called Peckie.
(d) My cat is called Peckie. The cat has four legs.

(14d) can be read as a coherent text: my cat and the cat can be understood to be coreferential, and here the cat readily has a non-generic reading (though one may wonder in the light of conversational maxims why the fact that Peckie has four legs is worth mentioning: perhaps there were invalid cats around?), in spite of the lack of pronominalization. In (14a-c), however, the interpretation of the four legs - sentence is primarily generic, and the intersentential tie is therefore weaker. In other words: the tie between a generic and a specific noun phrase is weaker than the tie between two generic or two specific noun phrases. This can also be seen in

(15) (a) The cat is a carnivore. {The cat / It} also has sharp teeth.
(b) The cat is a carnivore. *It is called Peckie.
(c) Peckie is my cat. The cat is a tidy animal and can be completely housebroken.

(16) Last night I saw two elks outside my cottage. In fact the elk is multiplying alarmingly on my island.

(15b) is comparatively strongly deviant because it is simultaneously the subject of an individualizing complement (is called Peckie) and coreferential to a generic noun, the cat. In (15a) and (15c), the acceptability is better: in the former sequence, both sentences have a primarily generic reading, whereas in the latter, the cat is a tidy animal may perhaps even allow a specific reading as referring to Peckie. Even in a generic reading such texts seem to allow generalizations advancing inductively from a specific reference in one sentence to a generic one in the next. (16) seems perfectly acceptable, thanks also to the added references to numbers and locations which also tie the sentences to one another.

3.7. A violation of normal patterns governing the placement of old or given, and new, information can be interpreted as a shift of referent and can thus weaken or annul the reference.

The general rule is that new discourse referents are introduced into a text in the rheme; if there is no chance of introducing the rheme by hanging it onto a theme expressing old information, special constructions (existential structures, etc.) must be used. Once a discourse referent has been introduced into the text, it counts as old information. It would take us too far to spell out all the relevant mechanisms, and a very few examples must therefore suffice:

(17) (a) In the room there was a chair. It was blue.
(b) *It was blue. In the room there was a chair.
(18) (a) In Chicago I went to a clinic. The eye-doctor was good.
(b) *The eye-doctor was good. In Chicago I went to a clinic.
(19) (a) The parade marched past. The drums were very loud.
(b) The drums were very loud. The parade marched past.
(c) Last Sunday I went to a parade. The drums were very loud.
(d) *The drums were very loud. Last Sunday I went to a parade.

In (17b), the deviance is caused by the switching of places of the sentence involving an existential structure introducing a new referent, and the sentence with the anaphoric reference. Sentence (18a) is similarly better than (18b) because a clinic is new information, as the indefinite article shows, and because clinics have eye-doctors. A similar relation obtains between (19c) and (19d). Sequences (19a) and (19b) are both acceptable, because their order may reflect the order in which the observations were made and the way in which the sequence is attached to its textual and situational envelope.

If of two potentially co-referential items the latter does not only identify the referent but also adds essential information, the coreference is weakened or annulled. Such a pattern runs counter to the basic principle that anaphoric themes should contain old rather than new information. For instance

(20) (a) ?I read a book last night. The absorbing novel was written by John Masters.
(b) ?I read a book last night. The novel by John Masters was absorbing.
(c) I read a book last night. It was an absorbing novel by John Masters.
(d) I read a novel by John Masters last night. It was absorbing.

But compare

(21) Last night I listened to Benny Goodman. The King of Swing still sounded great.

The reason why (21) is a better sequence than (20a) or (20b) is that Benny Goodman is, uniquely, known as the King of Swing, whereas a book is not necessarily the absorbing novel or the novel by John Masters: these

phrases add essential information. Like all proper nouns, Benny Goodman is definite, whereas a book is an indefinite noun. For correct interpretation of sequences such as (21), we must of course recognize the referential identity of the noun phrases involved.

3.8. An unmotivated shift in style can weaken the cohesion.

In a text such as

(22) (a) This Promotion and Tenure Document in its totality and as approved in its final form by the Committee shall be distributed to all members of the faculty, who shall cast their votes by secret ballot, the official tally being released to the Committee only after all votes have been received. And if you don't catch enough votes, you've had it.

As one result of shifts of style is to signal a break between text units or texts, a shift of this kind suggests a discontinuity in the cohesion pattern, even though the text makes good pragmatic sense. Thus the second sentence of (22) reads rather like somebody's commentary to the rule stated in officialese in the first sentence, and not like a direct continuation of the statute. The cohesion would be tighter had the style shift been motivated, as in

(22) (b) ... only after all votes have been received." To this, Professor Smith had added a marginal comment in his spidery hand: "And if you don't catch enough votes, you've had it."

3.9. Thus breaches against rules of agreement, anaphora and collocation, including discrepancies caused by polysemy or homonymy, referential and metalinguistic meaning, shifts of genericity, violations of normal patterns of given and new information, and shifts in style all suffice to impair or annul the connectivity between juxtaposed sentences. These instances have been grouped together because the signals of non-connection could be labelled as syntactic in the wide sense: concord, selection rules, the distinction between generic and specific meaning, and the treatment of old and new information are all concerns of syntax. (To what extent stylistic shifts are matters of syntax depends on what kind of syntax we wish to adopt.) In terms of wider referential and pragmatic coherence rather than syntactic cohesion, however, there is another way of summarizing the semantic effect of these breaches of normal cohesion patterns. And this is the observation

that sentences that fail to cohere refer to different possible worlds, to different universes of discourse. A lack of concord establishes a non-unity of a potential referent and refers the non-concordant elements to different worlds. Collocations assign different members of homonymic or polysemic sets into different worlds. Shifts of genericity move the discourse from the world of specific referents to the generic world or vice versa. And contradictions of patterns of old and new information also assign sentences to different worlds: if of two potentially coreferent phrases the first is marked as old and the second as new information, these phrases cannot refer to the same referent: the two referents must exist in different worlds.

4. Pragmatic indication of non-coherence

In the following types of instances, it would be more difficult to explain the difference between the worlds referred to in terms of formal syntax, at least within the current confines of syntax.Should we conceive of a syntax capable of formalizing for instance matters of time shift and of causality, these instances could have been listed in section 3.

4.1. Shift of referent, appearing as time shift, can weaken the reference.

(22i)(a) Next week I shall buy a Ford. The car in which President Wilson rode down the Champs Elysées was black.

If we hear or read this text today and know that President Wilson's heyday in Paris was in 1919, we are left wondering what is the connection between the modern Ford and President Wilson's car. In such instances we need a connection between the referents. The mere connection between Ford and car is not sufficient to establish a proper cross-reference. The coherence improves decisively through the addition of a connection, for instance in causal terms:

(22i)(b) Next week I shall buy a Ford. The car in which President Wilson rode down the Champs Elysées was black. Therefore I think I shall try to get a black Ford because I have always admired Wilson and I too want to drive down the Champs Elysées in a black car.

Though eccentric, such a text is perfectly coherent.

4.2. Explicit or implicit contradiction makes sentences refer to incompatible possible worlds, and the text becomes pragmatically unacceptable.

In texts such as

(23) (a) I have a blue-eyed wife. She has brown eyes.
(b) My dog is a collie. It is a German shepherd.

the contradiction blocks the coreference: in the same universe of discourse a person cannot have both blue and brown eyes, a dog cannot be both a collie and a German shepherd. Note once again, however, that the receiver of such a text is apt to look for metaphoric interpretations: blue-eyed in (23a) might thus be taken to mean 'innocent' or 'optimistic', which would improve the acceptability of the text.

The contradiction can also be implicit and embedded in an implication or presupposition, as in

(24) (a) John had drunk all the wine. Suddenly he poured it on the floor.
(b) There were three nude girls on the beach. After half an hour they all took their skirts off.

Once John had drunk all the wine, he could hardly pour it on the floor (vomit instead of pour would improve the text); once the girls were nude, they had no skirts to take off. Here too, then, sentences lack coherence if they obviously refer to incompatible worlds.

Similarly, the cross-reference is destroyed in instances such as

(25) (a) ??I wish I could afford a car. It is red.
(b) *I haven't got a car. It is red.
(c) ?I hoped to catch a fish. It was an enormous tuna.

(25a-b) both begin by referring to a world where I have no car, and go on assigning qualities to this non-existent object. (25c) is a better text because one can hope to catch a specific kind of fish; in (25a), a car does not change its price according to colour, so that red seems irrelevant to the speaker's desires.

Disambiguation of references can actually take place on pragmatic

grounds in instances such as

(26) Last night I was watching the old tv-film showing an astronaut jumping about on the moon. I was also baby-sitting with Peter. Actually he was also driving a jeep between the craters.

He in the third sentence must refer to the astronaut rather than to Peter: astronauts drive jeeps between craters, whereas boys who still need baby-sitters do not. In choosing an antecedent for an anaphoric reference we thus reckon with pragmatic probabilities and possible worlds. We do not have to choose the nearest antecedent that satisfies the requirements of formal concord. Rather we match the text against a set of possible worlds and assign the antecedent according to the interpretation which best fits the most likely world. In terms of Martin Joos's semantic axiom number one, we choose the interpretation that makes an item maximally predictable and thus maximally redundant, and minimally surprising (Joos 1972). This is a general phenomenon observable in, for instance,

(27) (a) John said that Peter had told him that the professor had praised his thesis.
(b) John boasted that Peter had told him that the professor had praised his thesis.

In (27a), his is ambiguous unless we know who wrote the thesis. In (27b), we can disambiguate his if we know something about the relations between John and Peter. If John has no reason to feel proud of Peter's doings, his must refer to John; if, however, John has good reasons to be proud of what Peter does (if, for instance, John is Peter's father or teacher), the sentence is still ambiguous. What we do in interpreting such sentences is that we match the semantic pattern indicated by boast (which involves a person's mentioning something he is proud of -- perhaps unduly -- to another person) against the various possible worlds that arise out of different interpretations of the text. The best fit between the configuration of roles implied by boast and one of the possible worlds of the text decides which interpretation we prefer. (See further Enkvist 1976.)

If two sentences are connected by a causality relation they can cohere without further overt cohesion markers. Compare

(28) (a) It was cold. Susan was wearing her thickest fur-coat.
(b) It was cold. Susan was in a filthy mood.

(c) It was cold. Susan was lisping as usual.

The causality can be made clear by causal subordination:

(28) (a') It was cold, which made Susan wear her thickest fur-coat.
(a") Susan was wearing her thickest fur-coat because it was cold.
(b') It was cold which caused Susan's being in a filthy mood.
(b") Susan was in a filthy mood because it was cold.
(c') It was cold which could be noticed in Susan's lisping as usual.
(c") Susan was lisping as usual because it was cold.

(28a'-a") are all right because we all know worlds in which it is rational to wear furs against the cold. (28b'-b") may be acceptable because we know, or can imagine, worlds in which people hate the cold. But (28c'-c") are odd: experience tells us that people lisp irrespective of the temperature. This is the reason why (28a) is the most acceptable, (28c) the least acceptable of the texts under (28). We can, then, test causal ties between sentences by subordination and by matching the resulting possible world with the world of the discourse.

When speaking about the connection between possible worlds and intersentential coherence we should, finally, remember that certain texts-- in absurd drama for instance --use abnormal patterns as symptoms of the world's craziness. Statements such as

(29) (a) I always buy my vegetables in the market because there they are more expensive.
(b) Thelma was wearing her thinnest summer dress because it was cold.

may be effective precisely because they break the usual patterns of causality and suggest possible worlds different from the everyday, just as poets such as e.e. cummings achieved peculiar effects by adopting a syntax different from the usual.

5. Borderline cases

So far, then, we have been able to spot the lack of connection between two sentences for one of two reasons. Either there has been a lack of syntactic connectivity, or the kind of lack of pragmatic plausability where

the sentences do not simultaneously fit into one and the same possible world. All of these instances have presented some syntactic or pragmatic evidence of non-connectivity.

But there are also instances in which such direct evidence of non-connectivity does not exist, and where direct evidence of connectivity is also lacking. For instance,

(30) The student's lesson was criticized by the inspector.
Whenever the islanders did the author a service, they expected him to make them a gift.

I have chosen these particular sentences on purpose to illustrate my point: whether two neighbouring sentences connect or not, when there is not explicit evidence for or against, depends on the interpreter and on his interpretation of the message. We are all familiar with private and semi-private language, for instance between colleagues or within a family, which is transparent to those in the know, and completely opaque to outsiders. For instance, to quote a piece of actual domestic dialogue from my own home,

(31) Tua: "Peckie refused again."
Nils: "Oh damn. Where are the gloves?"

To capture the connection one must know that Peckie the cat was supposed to take penicillin, which he disliked; experience had taught us the wisdom of using gloves when gently persuading him to take his medicine. To an outsider such a dialogue might well seem incoherent, however clear it is to those in the know.

When hearing such a message, the receiver assumes that this interlocutor obeys the conversational maxims accepted as normal behaviour. The message is expected to make sense. Therefore the receiver does his utmost to extract a maximum of meaning out of the text. And the extraction of meaning involves tracing intersentential links. Thus when we are exposed to a text such as (30), we at once begin trying to maximize its meaning. We test a number of hypotheses: perhaps the student had said that the islanders always refused gifts? Perhaps this statement is what the inspector criticized? Perhaps the inspector was an islander and did the student a good turn by criticizing him and therefore deserved a gift? Only if all such attempts at forming hypotheses about possible cohesion patterns fail, or if the hypotheses are disproved by what comes next, do we give up and dismiss the text as incoherent. Text (30), the reader may wish to know, was a juxtaposition of two unconnected

sentences picked at random out of an anthology: they had no connection in their original context. But this is irrelevant. What matters is whether we, as receivers of the message (30), succeed in finding the sentences interlinked or not.

Often a receiver is prompted to look for metaphoric interpretations to extract maximal sense from, and to find cohesive ties in, a text. This is true between sentences as well as within the sentence. Compare

(32) (a) Before 1968, twice two was four.
(b) Before 1968, a number of things were always true. Twice two was four.

Here before 1968 clashes with our knowledge that twice two is always four, even though in (b) there is an obvious tie between number of things were always true and twice two is four. We are therefore compelled to a metaphorical reading where twice two was four stands for something like 'the world was still a rational and orderly place'.

6. Iconic homomorphism as pseudo-coherence

Finally, at a different level of linguistic structure, there are instances where a text gains in cohesion thanks to a formal isomorphism which is not backed up by semantic coherence. That is, two neighbouring sentences are phonetically or syntactically isomorphic, but fail to cohere semantically.

(33) I went to town to see my dearest Sue.
On Daddy's desk it saw a tube of glue.

These two sentences are metrically isomorphic and share a rhyme. Even so, as such they do not even qualify as doggerel verse because they have no apparent semantic or cross-referential connection. At best they might come from different parts of the same poem, or then the first line might end and the second begin a section of a poem. There are also instances of syntactic isomorphism:

(34) The big bad wolf ate the pretty little baby.
The sumptuous four-poster bed dominated the blue-curtained master bedroom.

Both sentences have identical structures at one level of syntactic description: both consist of the + two qualifiers + substantive + transitive verb + the + two qualifiers + substantive. Without additional clues, such an isomorphism alone is not enough to establish cohesion or coherence. It is another matter that contextual isomorphisms of these kinds may increase the acceptability of sentence patterns that might seem odd without such justification. For instance,

(35) ?To me the book she will not give.

looks odd in isolation because of its highly marked thematic structure involving double topicalization. But in the couplet

(36) To me the book she will not give:
She thinks I should not read but live.

its acceptability improves. Now there is a motive for the choice of the highly marked sentence pattern.

7. Conclusion

The examples cited here have supported the view that total coherence is not only a matter of cohesion on the textual surface. If a text is to be well formed it must have semantic coherence as well as sufficient signals of surface cohesion to enable the receiver to capture the coherence. And there are pragmatic constraints on this semantic coherence. In semantic terms one could suggest that a text is understood to be coherent if its sentences conform to the picture of one single possible world in the experience or imagination of the receiver, and if this pragmatic unity is adequately signalled on the textual surface. Adequately, that is, for the receiver to grasp the connections, including lexical cross-references, and to build up the corresponding world picture. Thus mere mechanical linking of neighbouring sentences, as in (1), is not enough. If not supported by a pragmatic coherence, the result is mere pseudo-coherence, not full coherence.

In conclusion it is proper to stress that here I have been primarily concerned with coherence as a qualitative concept: either two sentences cohere or they do not. Even so, I have been compelled to distinguish between

degrees of coherence. Some sentences and texts are intuitively felt to cohere more strongly, others more weakly, and some not at all. This leads us to the problem of measuring degrees of coherence in a text. Is it in fact possible to rank texts on a scale of cohesive tightness? Intuitively, yes: some texts seem closely argued, tight, and logically strict, whereas others are loose, rambling, and lacking in logic. Here I can only remind the reader that there are, in theory, two major approaches to measuring degrees of cohesion in texts. One is based on elicitation: we ask groups of suitably selected people to rank texts according to their impressions of their coherence. (The minimum group in elicitation experiments is, of course, the linguist himself.) In practice, this turns out to be an exercise more like rhetorical or literary criticism than strict linguistics. The other approach presupposes an ability of tracing cohesive devices in a text and of classifying and counting them (for an attempt restricted to surface cohesion, see Buxbinder and Rosanov 1975).

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AN ANALYSIS OF TEXTUAL COHESION IN A PASSAGE FROM MARIA GRIPE'S "HUGO OCH JOSEFIN"

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1. What is textual cohesion?

The study of textual cohesion has recently attracted much interest among linguists. The goal of this study has roughly been a method of determining what constitutes a well-formed, coherent text. Particular interest has been directed towards questions such as the following ones: How can a coherent text be distinguished from an incoherent one? What kind of elements can serve as connective links between the sentences in a well-formed text? Can cohesion be measured by counting connective links? What connective links have to be present for a text to be perceived as natural and coherent, and what links can be present in an incoherent text?

It is my impression that the concept of connective link is a fruitful one, but that it should not be too narrowly defined. A connective link is not always a relation between well-defined parts of the sentences in the text, e.g. two identical words. The link can also be a relation between entire sentences, or rather, between propositions. We also have to distinguish between a symptom and a cause of cohesion. It appears to me that an identity relation between two noun phrases, hyponymy, antonymy etc., generally are merely symptoms of cohesion, and that the real causes are the connective links between the propositions in the text. Such connective links

give a text *factual cohesion*, or *coherence*.

When several sentences are intuitively felt to have the same topic, they normally can be said to build up a common discourse universe. A particular sentence, for example, elaborates the picture of the world given in the preceding sentences; this is a typical example of factual cohesion. A particular individual in the discourse universe already specified is pointed out and some new information is given about him, e.g. his relation to some new individual, who is thereby introduced into the discourse universe. The elaboration of the old discourse universe thus involves a repetition of the mention of a previously mentioned individual.

But the mere repetition of a noun phrase is not enough to give a text factual cohesion. It is also required that the propositions of the text are comparable in some respect, or that they together form an argument or a chain of events which normally occur together. It is quite common that several propositions in a text are examples of the same general rule or enable the reader to draw the same inference. This is generally referred to as 'reading between the lines'. If two sentences form a seemingly incoherent text, but enable the reader to draw a common inference, the text will aquire more coherence than expected.

2. An analysis of a text

This preliminary discussion of the causes of textual cohesion is rather vague, and I shall therefore present a more detailed discussion of the factual cohesion in a specific text. The object of the analysis is the first 29 sentences of a children's book in Swedish, "Hugo och Josefin" by Maria Gripe. The entire text is given in an appendix. Here I give the English translation alone, sentence by sentence, followed by rather detailed comments on each sentence. In spite of its simple discourse universe and the low age of its intended public, the text makes use of quite complicated cohesive devices.

Title: Hugo and Josefin

Two individuals are introduced: one presumably male and the other female. This guess is motivated by our knowledge of the language and of the relevant world. Items called Hugo are normally male living creatures, and items called Josefin female, although this is not absolutely necessary. Since we know that the text is taken from a children's book, we may also guess that Hugo is a boy and Josefin a girl, since the main characters in

children's books often are children, and since the title normally refers to the main characters. However, this second guess is much more uncertain than the first one. This illustrates how we establish the identity of the individuals in the discourse universe, assigning to them various properties with varying likelihood, varying degrees of e x p e c t a n c y . Only explicitly mentioned properties are certain; other properties are merely expectable, or predictable, and can be corrected as the interpretation of the text proceeds.

(1) They are on their way to the roll-call at school, Mummy and Josefin.

A spatio-temporal scene is presupposed, although it is not further specified, and in this scene two individuals are said to be moving towards a destination. One of them, Josefin, has been mentioned before, and it is therefore natural to relate the other individual to her; Mummy is then interpreted as Josefin's mother. Another possible interpretation would be the narrator's mother. Some readers will be aware of this, thus forming a l t e r n a t i v e e x p e c t a n c i e s , alternative pictures of the world of the text. Other readers will probably overlook this possibility, since the narrator is not explicitly mentioned in the text. The interpretation 'Josefin's mother' also gets further support in the sentence; mothers often follow their children to school when they start first grade. This sentence then enables the reader to form a host of expectancies: it is mid-August (i.e. the beginning of the Scandinavian school year), Josefin is about 7 years old, going to her first day at school. Later on, we shall see that these expectancies are confirmed, and this confirmation serves as a cohesive device.

The text starts in medias res. The scene is not described, and the destination of the movement described is referred to in Swedish by a noun phrase with a definite article, which should indicate that it is previously known. Similarly the individuals are referred to by <u>they</u>, which has to be specified by a dislocated coordination <u>Mummy and Josefin</u>, to be understandable at all. The start in medias res is perhaps made possible by the fact that the previous experience of the reader provides him with a ready frame into which he can place the content of the sentence: a girl on her way to her first day at school. This ready frame also provides the many expectancies mentioned in the last paragraph.

(2) It is a beautiful day, the cicadas are playing in the grass, and the wind is making a rustling sound.

This sentence is automatically understood as describing the scene presupposed in the first sentence, on the basis of what could be formulated as the p r i n c i p l e o f t h e c o n t i n u e d s c e n e: when possible, a sentence will be understood as specifying the same scene and topical referent as the preceding sentence. The consequence of the principle is a cohesive link between the sentences. It seems that the reader will always try to find cohesive links between the sentences of a text, and the continued-scene principle is one way of supplying cohesion, when no explicit cohesive link is given.

Although the three clauses in sentence (2) do not share any common noun phrase, there are quite strong cohesive links between them. If it is a beautiful day in the summer, cicadas are quite likely to play and the wind is very likely to make a rustling sound. The clauses are not only compatible with each other (i.e. it is possible for the clauses to simultaneously express true propositions), it is also likely that they are true simultaneously; there is an expectancy relation between them, which strengthens the cohesion of the passage. Simultaneously, a cohesive link to the preceding sentence is created, since this kind of weather is quite likely to occur in mid-August, when school starts. Observe that the reference of an expectancy relation need not always be two 'overt' sentences, but that it also can hold between an overt sentence and an expected one, i.e. a sentence which is not explicitly mentioned, only implied. Nevertheless, this expectancy relation will serve to increase the cohesion of the passage.

The expectancies are often extremely subtle and uncertain. In sentence (2), the fact that cicadas are mentioned might suggest that Josefin is walking, since otherwise she would not have heard the cicadas. This presupposes that the text is in some sense written from Josefin's point of view, that the speaker's empathy lies with Josefin. This is not an unreasonable assumption, since Josefin's mother seems to be mentioned as Mummy, i.e. is identified by her relation to Josefin, not by an independent description. A consistent point of view also functions as a cohesive device.

(3) Josefin wears a bow in her hair and on her feet new shoes, red -- quite shining.

Here the established discourse universe is further elaborated. A known individual, Josefin, is being described, and this creates a cohesive link to the title and to sentence (1). But the whole sentence also expresses a predictable fact. Girls going to their first day at school often wear this type of clothes and this strengthens the cohesive link to sentence (1).

Furthermore, the bow and the shoes are parallel instances of fine clothing, which in turn creates a cohesive link within the sentence.

(4) There is a light wind-- now and then she must make sure that the bow is as it should be.

The beginning of this sentence repeats the end of sentence (2), or rather, mentions one of its presuppositions: if there is a sound made by the wind, there must be a wind. This is an obvious cohesive link. The function of this repetition seems to be to remind the reader of a fact which serves as a point of connection for the rest of the sentence. The relation between the beginning and the end of the sentence is one of expectancy: if there is a wind, it is likely to ruffle Josefin's hair and bow, and if that happens, Josefin is likely to see to it that the bow is kept tidy. This presupposes, however, that Josefin is a nice girl who wants to be tidy. This information can therefore be read between the lines. A reader who wants to maximize the cohesion of the text will automatically supply this information.

(5) There is dust on the road and she must all the time see that her shoes do not get dust on them.

Here, the road can be regarded as a given discourse referent. However, this does not guarantee that the sentence coheres with its context. More important is the expectancy relation between the first clause of the sentence and the rest. The mechanism is here exactly parallel to the one in sentence (5), and this iconic resemblance also serves as a cohesive link. But I think that the main function of the iconic relationship is to emphasize the information given in the related sentences. Much more important for the cohesion is the fact that sentences (4) and (5) have a common implication: Josefin is a good girl. The sentences have a common purpose.

(6) As they approach the school, other mothers and other children are coming from all directions.

It is of course an expected fact that Mummy and Josefin will approach the school, given that they are on their way to the roll-call there. Therefore, sentence (1) links to sentence (6). Given our knowledge of the world, it is also to be expected that other mothers and other children will be coming there. A further similarity between the new individuals on the one hand and Josefin and her mother on the other is that they all come in pairs; however, this is not essential for the cohesion of the passage. What is more

important is that they are likely to occur together in the same situation.

(7) All of them look a little solemn.

This sentence adds new information on given discourse referents. Observe, however, that the seriousness of the mothers and the children is not unexpected, given our knowledge about similar situations.

(8) All of them have the same destination.

This sentence is almost a truism, given the preceding sentences. If children and their mothers are converging on a day when there is a roll-call at school, it is most likely that they are on their way to the roll-call. Strictly speaking, it need not be so, but the reader's tendency to maximize the cohesion in a text almost inevitably leads him to this conclusion. The sentence is therefore totally expectable, though not predictable in the sense that no other sentence could have taken its place, which could have happened perfectly well.

The function of sentence (8) seems to be to emphasize the importance of the destination, and to suggest that the individuals involved are thinking about this destination rather intensely, which might be the reason for their solemn appearance. This therefore constitutes a causal cohesive link between sentences (8) and (7).

(9) The school.

Gives further emphasis to the destination.

(10) Almost everyone says "Good morning" to Mummy.

This sentences gives new information about the given discourse referents, although it is not totally unexpectable. It also implies something which is not explicitly stated; the sensitive interpreter might observe that it is only the other people who say "Good morning", while Josefin's mother is passive. This might suggest that Josefin's mother is of higher social rank than the other people, since in this culture a person of lower rank should greet a person of higher rank, and this expectation will be confirmed later on. It is harder to guess why some of the people did not greet Josefin's mother (n.b. A l m o s t everyone...).

(11) They recognize her because she is married to Daddy Father, who is the parson of the church.

This sentence connects with the preceding one -- Mummy's high social rank is confirmed. Furthermore, this social position makes it expectable

that she will be recognized, and this expectancy further strengthens the cohesion of the text. In the Swedish text Pappa Far (Daddy Father) is spelled with capitals, unlike mamma (Mummy). This can be taken to express either admiration or a solemn relationship between Josefin and her father.

(12) Then Josefin curtseys and the strange mothers push their children, so that they too curtsey and bow to Mummy.

This sentence describes a rather expectable ceremony, but some interesting observations can be made. Josefin drops a curtsey voluntarily, while the other children are almost forced to do so. However, Josefin's behaviour is quite expected, since we know from sentences (3) and (4) that Josefin is a good girl. The new implication is that the other children are not as good as Josefin.

(13) Everyone is very polite today.

This sentence is in a way a summary of sentences (10) and (12). However, it seems somewhat ironic, since not all the people had greeted them and since the children are polite only upon request. It also suggests that they are not equally polite at other times, which further stresses the fact that the day of the roll-call is a solemn one -- cf. the description of Josefin's clothes.

(14) Josefin has seen some of the children before, but does not know anybody.

Rather unexpected information is here given about the relation between Josefin and the other children. We can observe a gulf between Josefin and the other children, which was in fact already suggested in sentence (12). The good girl, Josefin, does not know the bad children.

(15) Many of them have teased her, and called her old-fashioned, but now there is nothing like that to be heard.

Again, it is expectable that the bad children might have teased the good girl. There is, then, a weak cohesive link to sentences (12) and (14). Similarly, it is quite expectable that the solemn situation and the presence of their mothers will prevent the children from teasing her now. This links the sentence to sentences (7), (12), (13), etc.

(16) They all walk quietly beside their mothers.

This sentence is parallel to the last clause of the preceding sentence and is connected to the same sentences as that sentence. It is quite to be

expected that their mothers, and the solemn situation -- perhaps the thought of a gloomy future at school -- make the children keep quiet.

(17) The mothers talk to each other, but the children do not say a word.

The latter part of the sentence repeats the preceding one, but here the opposition between grown-ups and children is made clearer.

(18) Although they know each other and play every day in the village, they behave like total strangers now.

Here the opposition between Josefin and the other children is indirectly confirmed. The other children are said to know each other, but in sentence (14) we learnt that Josefin does not know the other children. The good girl Josefin, and the well-behaved grown-ups, are thereby almost put into the same category, since they are both contrasted with the children. The latter part of the sentence further emphasizes their solemn appearance.

(19) They just stare at each other.

The sentence repeats the theme of the passage -- the silence of the children, due to the gravity of the situation.

(20) There goes Edvin Pettersson with his sturdy mother.

A new paragraph is introduced, and one of the pairs introduced in sentence (6) is picked out.

(21) Usually he is the horror of the villagers -- but the pride of the children.

This sentence contains unexpected information on a given individual, but the opposition between the grown-ups and the children which was suggested in sentences (12) and (17) is further emphasized.

(22) A little savage that nobody is safe from.

The sentence elaborates the first part of sentence (21). Here the point of view seems to have shifted from Josefin to the villagers. This fact further strengthens the affinity between Josefin and grown-ups which has been hinted at before. We can also observe that the pejorative word vilde, 'savage', coheres with the irony in sentence (13).

(23) A rumpled forelock that can be seen everywhere.

This description fits the picture of a rascal which was sketched in the two preceding sentences.

(24) Today he is standing there somewhat shyly, slicked down with water, and pale.

This sentence is parallel to sentences (7) and (16-19). The only difference is that here just one individual, not the whole group, is said to be shy and quiet. The sentence emphasizes the contrast between the day of the roll-call and other days. This is a common purpose for many sentences in the passage.

(25) Dejectedly he glares at the other small ragamuffins in the gang, also newly scrubbed.

The sentence is parallel to the preceding one, but also re-introduces the other children into the focus of attention. We can also observe the pejorative words fröna, 'ragamuffins', and nyskurade, 'newly scrubbed', which form a cohesive link to the word vilde, 'savage', in sentence (22).

(26) Nobody says a word.

The sentence repeats sentence (17).

(27) Everything is full of solemnity on this day.

The sentence almost repeats sentence (7), and re-emphasizes the gravity of the situation.

(28) The high school-gates are wide open.

A fact like this is quite to be expected on a day when school starts. (More informative is the presupposition that the school had gates at all!) It is justified to mention this information because this focusses the attention of the reader on the destination of the movement mentioned in sentences (1) and (8).

(29) They walk through them.

The destination is reached.

3. Conclusion

Let us now summarize our observations. The text receives much of its coherence from the fact that it describes a single event (with some small excursions): a group of children are walking to their first day at school, accompanied by their mothers. Given this situational background, almost all the facts of the story are to be e x p e c t e d -- i.e. in such a

situation it is quite normal for such things to happen. This is a substantial source for the coherence of the text. It should be observed that the expectancy relation does not always hold between facts explicitly mentioned in the text. What can be read between the lines is often very important for the cohesion of the text. Two sentences can for instance have the same expectations, which itself will serve as a cohesive link between them. In fact, the reader seems to have a tendency to look for such implicit cohesive ties in order to maximize the coherence of the text. The need for coherence leads him to read between the lines.

But the expectancy of the sentences of a text is of course not the only way of giving coherence to the text, perhaps not even a necessary ingredient. We can also observe in our example how a rather primitive and simple discourse universe is gradually expanded into a more elaborate one. New individuals related to the old ones are introduced, and more information on these individuals is given. A discourse referent already given normally serves as a point of connection for the new information. This also gives the text coherence, especially if the new information is expectable against the background of the old discourse universe. But the expansions are seldom arbitrary and do not go in any direction. The text should also make a principled choice between the expected expansions in order to be coherent. In our example, many of the sentences collaborate to give a picture of the social relations between the individuals on the scene and of their attitude to the school. The sentences of the text often enable the reader to draw some inference -- e.g. sentence (5) makes him think that Josefin is a good girl. Such an inference is often essential to the coherence of the text, and can then be called a p u r p o s e . A common purpose for several sentences in the text serves as a very strong cohesive device.

There are several types of cohesion. In this paper, I have concentrated on one type, factual cohesion or coherence. It can be defined as a relation between the propositions of a text -- the propositions form together a story or an argument which is consistent with our expectations, formed on the basis of our previous experience. It should not be confused with the presence of c o h e s i o n m a r k e r s , such as the occurrence of repetition, antonyms, hyponyms, conjunctional adverbs, pronouns etc. These cohesion markers are neither a necessary, nor a sufficient condition for factual cohesion. They are just s y m p t o m s of it. The cohesion markers are partly an automatic consequence of the factual cohesion, partly a deliberate result of the speaker's wish to bring out

clearly the coherence of the text and give it emphasis.

We can also speak of s i t u a t i o n a l c o h e s i o n, which arises when a set of sentences are uttered in the same speech act. Here the factors of the speech situation are kept constant: speaker, time, place, probably also listener, medium and code. The unity of the speech situation gives a certain impression of cohesion, which can be marked by special cohesion markers, such as the occurrence of words with the same stylistic flavour, sentences with roughly the same complexity, a uniform voice level, etc.

A special type of cohesion marker is i c o n i c c o h e s i o n, i.e. similarity between text units on the level of expression. It is manifested in rhyme and meter, the repetition of sentence patterns or other syntactic units. Such iconic cohesion does not give coherence to a text, but it can serve to emphasize a similarity on the level of contents. In fact, all factual cohesion can probably be reduced to similarity between propositions on the level of contents. The similarity can take the form of having a common purpose, being expected to be true in the same situation, being elaborations of the same discourse universe.

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APPENDIX

The beginning of Hugo och Josefin by Maria Gripe.

(1) De är på väg till uppropet i skolan, **samma** och Josefin.
(2) Det är en vacker dag, syrsorna spelar i gräset och vinden susar.
(3) Josefin har rosett i håret och på fötterna nya skor, röda -- alldeles blanka. (4) Det blåser litet -- då och då måste hon känna efter att rosetten sitter som den ska.
(5) Det dammar på vägen och hon måste ideligen se till skorna, så de inte får damm på sig.
(6) När de närmar sig skolan, kommer från alla håll andra **mammor** och andra barn. (7) Alla ser litet högtidliga ut. (8) Alla har samma mål. (9) Skolan.
(10) Nästan alla hälsar på **samma**. (11) De känner igen henne för att hon är gift med Pappa Far, som är präst i kyrkan. (12) Då niger Josefin, och de främmande **mammorna** puffar på sina barn, så de också niger och bockar för **samma**.
(13) Alla är mycket artiga idag.
(14) Josefin har sett en del av barnen förut, men känner ingen. (15) Många har retat henne, kallat henne gammalmodig, men nu hörs inte något sådant.
(16) Alla går tysta bredvid sina **mammor**. (17) **Mammorna** pratar med varandra, men barnen säger inte ett ord. (18) Fast de känner varann och leker var dag i byn, beter de sig alldeles som främlingar nu. (19) De bara stirrar på varann.
(20) Där går Edvin Pettersson med sin stadiga **samma**. (21) I vanliga fall är han bybornas skräck -- men bybarnens stolthet. (22) En liten vilde som ingen går säker för. (23) En rufsig kalufs som syns överallt. (24) Idag står han där litet blyg, vattenkammad och blek. (25) Förstämd bligar han på alla de andra små fröna i gänget, lika nysakurade de. (26) Ingen säger ett knäpp.
(27) Allt är högtidlighet denna dag.
(28) De höga skolgrindarna står vidöppna. (29) Man går genom dem. ---

SOME ASPECTS OF DISCOURSE AND COHESION

by

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0. Introduction

Sociolinguists examining the structure of speech events, anthropologists interested in describing life in structural terms, and literary critics concerned with the structure of narrative have all been working with units of language larger than the sentence. Their interest overlaps with that of linguists who wish to describe how sentences are joined together in the formation of texts. From the linguistic point of view there are two main approaches to 'textuality' at present, that of cohesion and that of discourse. Discourse analysis has so far been concerned mainly with the structure of verbal interaction viewed as on a higher level than grammar. Cohesion, on the other hand, is seen as a description of the resources of the language system for generating interconnected series of sentences in an integrated text. It posits no higher level of units -- except perhaps for t e x t -- but works with units of description which are located in the grammatical system.

Faced with these two approaches, the natural question is: discourse or cohesion?

Widdowson (1973) distinguishes the two approaches by using the term t e x t a n a l y s i s for the study of the cohesive properties of texts. By cohesive properties he means the surface features of sentence connection. The relations of underlying speech acts, or the study of coherence, he terms d i s c o u r s e a n a l y s i s. This distinction is made obvious to him by the fact that certain exchanges can be coherent as discourse without being

cohesive as text, as is the case in the following example:

(1) Meg: Your tea!

You haven't had your tea!

Petey: I'm late already.

In the same way as Widdowson distinguishes c o h e r e n c e from c o h e s i o n, Halliday & Hasan (1976) distinguish d i s c o u r s e from c o h e s i o n. They claim that discourse analysis cannot account for the semantic unity of texts. They distinguish a text from a disconnected sequence of sentences by the fact that in the former case the constituent parts are linked together by cohesive devices. The use of reference items requires a text to be co-interpreted in relation to some other, often preceding item. Such a relationship is considered semantic in as much as it involves interpretation. The semantically constituted unit t e x t is built up on the basis of such relationships. By treating cohesion as the set of meaning relations which create integrated texts, Halliday & Hasan distinguish it from discourse. Whereas for Widdowson intersentential ties cannot by themselves account for the coherence of discourse, for Halliday & Hasan notions of discourse structure cannot in themselves account for the 'texturedness' of a text.

The starting point for this paper is the assumption that discourse and cohesion are complementary approaches to the study of texts. Attempts will be made to put forward the suggestion that these two approaches can be combined in the practical analysis of a text by basing the analysis of cohesion on a framework created for discourse analysis. Accordingly, the first part of the paper deals with a system for discourse analysis; the second part is concerned with cohesion between discourse units, discourse cohesion; and the third part deals with cohesive devices. The discussion is based on an analysis of two plays by Harold Pinter, The Birthday Party (BP), and The Dumb Waiter (DW).

1. Discourse

The idea of discourse analysis as the study of the coherence of underlying speech acts is helpful for the discussion in this paper, but in a somewhat modified form. The material for this paper, the plays, are seen to be coherent. If these plays were not coherent, the communication in them would be non-sensical, and they would probably not exist at all. Coherence is seen, in a more general sense, as the chain of events (cf. the notion of 'Event-Line' in Gutwinski 1976) that forms the speech situation in question.

This underlying order, or coherence, finds expression in different kinds of realization on the surface. First the structural realization will be discussed.

Discourse analysis is to be distinguished from text analysis, because its techniques are more functional and sociolinguistic than those of text analysis.

The discourse-analytical method to be discussed in this paper is based on the ideas presented in Sinclair et al. (1972), and more fully in Sinclair & Coulthard (1975). The work by Sinclair and Coulthard is concerned with presenting a theoretical framework for analysing teacher-pupil interaction, and it contains speculations about the applicability of this framework to ordinary conversation. Theirs is a rigorous socio l i n g u i s t i c descriptive apparatus emphasizing the importance of the four criteria (cf. Sinclair & Coulthard 1975:15-17) necessary for a satisfactory structural description of discourse. It is to be distinguished from the work of the s o c i o linguists, Sacks, Schegloff, Jefferson, etc., which is full of insight but less rigorous. The Sinclair-Coulthard method of analysis is a micro-functionalist approach to the analysis of spoken language, in which all utterances are seen as functioning only in terms of the ongoing discourse, and in which -- to take an extreme example -- an item classified as an 'aside' has no function at all. It is opposed to other functionalist schema, e.g. those proposed by Jakobson, by Hymes, or by Halliday, where all utterances are considered as functioning in terms of the discourse, the participants, the real world, etc., and carry several different functions simultaneously. Through the concepts of situation and tactics it is their p l a c e in the ongoing discourse which decides how items classified by grammar and function are ultimately defined.

To describe the interaction inside the classroom Sinclair and Coulthard devised a rank-scale model based on Halliday's grammatical system as first outlined in his 'Categories of the Theory of Grammar' (1961). The basic assumption of a rank scale is that a unit at a given rank is made up of one or more units of the rank below, and combines with other units at the same rank to make one unit at the rank above. The unit at the lowest rank has no structure. Figure 1 shows the different ranks of discourse and their relations to other levels, those of grammar and non-linguistic organisation.

Non-linguistic organisation	DISCOURSE	grammar
course		
period	LESSON	
topic	TRANSACTION	
	EXCHANGE	
	MOVE	sentence
	ACT	clause
		group
		word
		morpheme

Figure 1.

The discourse ranks are defined in the following way:

- A lesson is the largest discourse unit. It consists of a number of transactions and is often co-extensive with the pedagogical unit period.
- A transaction consists of a series of exchanges, typically bounded by an opening and a closing exchange. Transactions usually have one purpose only, and are built around one of the major types of exchange: Inform, Direct, and Elicit.
- An exchange typically consists of an Initiation, a Response, and possibly a Feedback. Exchanges involve two or more utterances that are dependent on one another but are spoken by different participants in the conversation.
- A move is the smallest free discourse unit that has an internal structure consisting of lower-rank discourse units, i.e. acts. A move constitutes a coherent contribution to the interaction that essentially serves one purpose, e.g. Framing, Responding, Follow-up.
- An act is the smallest discourse unit and corresponds roughly to the grammatical unit clause. It is, however, a functional unit. Some major acts are Elicitation, Directive, Informative, each of which can be realized by different grammatical sentence types. The category of act is different from, for instance, Austin's illocutionary acts and Searle's speech acts; discourse acts are defined principally by the way they serve to initiate succeeding discourse activity or respond to earlier discourse activity.

1.1. Description of the discourse-analytical system of analysis. -- The following description is based on the Sinclair-Coulthard system but has been extended, and adapted to the purposes of the present paper. The changes that have been made basically relate to two areas: (a) discourse units which are mostly classroom specific have been omitted, and (b) new discourse units have been set up to fulfil the needs of the present analysis. Whereas in the classroom it is the teacher who is in control of the situation, in the plays' interaction there is nobody who has such a clear and unopposed domination as a teacher; on the contrary, the characters tend to argue, quarrel, persuade one another, etc.

The basic unit of analysis is the exchange, which consists of moves between at least two participants. I distinguish two kinds of exchange, b o u n d a r y exchange, and c o n v e r s a t i o n a l exchange.

Boundary exchanges are optional at the opening of transactions. Their function is to signal the beginning and end of the transaction. Boundary exchanges consist of a frame and/or a focus.

Conversational exchanges are the individual steps by which the conversation progresses. There are fourteen subcategories with specific functions and structures. Of the fourteen subcategories nine are f r e e, and five are b o u n d exchanges.

The main functions of the free exchanges are Eliciting, Directing, Informing, Suggesting, Challenging, Announcing, Requesting, Accusing, and Ritual. They are distinguished by the type of act that realizes the head of the initiating move: Elicit (el), Direct (d), Inform (i), Suggest (sugg), Challenge (cha), Announce (ann), Request (req), Accuse (acc), and Ritual (rit), respectively.

An exchange is said to be bound either if it has no initiating move, or if its initiating move has no head, or if it reinstates the topic that has been either diverted or delayed or has not been accepted as a topic. Five types of bound exchange are distinguished: Bound initiation, Re-initiation, Reinforcement, Bound elicitation, and Repeat.

Five types of move are realised: Framing, Focusing, Opening, Responding, and Follow-up moves. Framing and Focusing moves are markers of transaction boundaries. They are made up of acts that are attention-getting, pre-topic items. Opening moves set up expectations which Responding moves fulfil; they set up constraints and therefore delimit the choices of appropriate and acceptable Responding moves. A Responding move can also itself set up

expectations, and can be followed by a Follow-up move, or by a new Opening move. Follow-up moves are usually restricted to commenting on the Responding move or providing extra clarification. A Follow-up move may be followed by another Follow-up move, but this means that the options open to the speaker in choosing an acceptable Follow-up move are being narrowed, continually.

Figure 2 presents a formal description of the rank scale.

RANK I INTERACTION Elements of Structure	Structures	Classes of Transaction
	An unordered series of transactions	
RANK II TRANSACTION **Elements of Structure**	**Structures**	**Classes of Exchange**
Preliminary (P) Medial (M) Terminal (T)	$PM(M^2...M^n)(T)$	P,T: Boundary M: Conversational
RANK III EXCHANGE (Conversational) **Elements of Structure**	**Structures**	**Classes of Move**
Initiation (I) Response (R) Continuation (C)	$I(R)((C))^n$	I: Opening R: Responding C: Follow-up
RANK III EXCHANGE (Boundary) **Elements of Structure**	**Structures**	**Classes of Move**
Frame (Fr) Focus (Fo)	$(Fr)(Fo)^*$	Fr: Framing Fo: Focusing

Figure 2 (part I)

[*] Both Fr and Fo can be present, but at least either of them has to be present.

RANK IV MOVE (Focusing)		
Elements of Structure	Structures	Classes of Act
Signal (s) Pre-head (pre-h) Head (h) Post-head (post-h)	(s)(pre-h)h(post-h)	s: marker/summons (m/sum) pre-h: starter (st) h: metastatement post-h: comment (com)

RANK IV MOVE (Framing)		
Elements of Structure	Structures	Classes of Act
Head (h) Qualifier (q)	hq	h: marker/summons q: silent stress (-)

RANK IV MOVE (Opening)		
Elements of Structure	Structures	Classes of Act
Signal (s) Pre-head (pre-h) Head (h) Post-head (post-h)	(s)(pre-h)h(post-h)	s: marker/summons pre-h: starter h: choice of inform/accuse/ direct/request/suggest/ challenge/ritual post-h: prompt/comment

RANK IV MOVE (Responding)		
Elements of Structure	Structures	Classes of Act
Pre-head (pre-h) Head (h) Post-head (post-h)	(pre-h)h(post-h)	pre-h: accept/acknowledge h: choice of reply (rep)/ react/response (res)/excuse/ accept/acknowledge (ack) post-h: comment/prompt

RANK IV MOVE (follow-up)		
Elements of Structure	Structures	Classes of Act
Pre-head (pre-h) Head (h) Post-head (post-h)	(pre-h)h(post-h)	pre-h: accept h: clarification (clar)/ comment post-h: comment/prompt

Figure 2 continued.

So far we have been concerned with predictive discourse structuring with acts, moves and exchanges. The basic assumption was that the rules of the exchange structure provide the essential organisation of the utterances. A further step in the analysis is therefore to see which of the alternatives speakers realise within the exchange. This means an examination of the predictive structure in a retrospective way. It is also the way to find evidence of patterns of language above the rank of exchange. As ranks above that of exchange, I recognise sequence, transaction, and interaction. These, however, shall not be discussed in any detail here. Furthermore, their structure still remains largely unspecified, and only their boundary markers can be reasonably distinguished.

Figure 3 is based on the diagram in Sinclair (1975:14), and shows the relationships between the realisation systems of language and appropriate content systems. The figure divides verbal communication into three parts. In the 'lowest' part, language is the primary organising principle i.e. up to the level of exchange. The 'middle' part is a transitional band where the distinguished patterns are stylistic. Above these two, the organisation becomes essentially non-linguistic and such regularities that occur are confined to boundary markings.

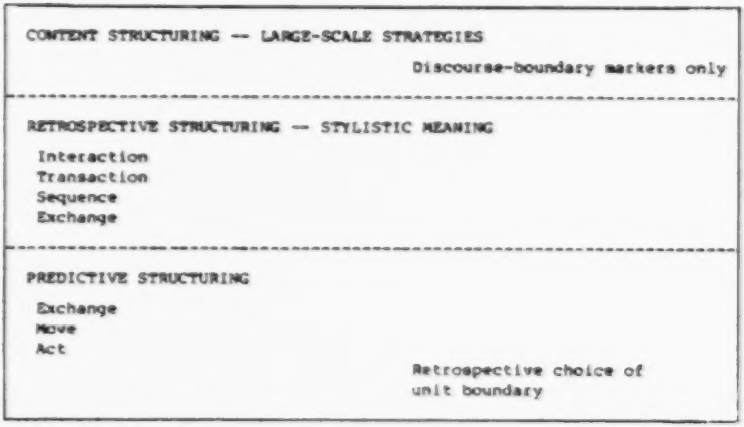


Figure 3.

1.2. Example of an analysis of discourse. -- Example 1 is a brief illustration of an analysed text. The three major columns indicate the three most frequent moves, Opening, Responding, and Feedback. The narrow columns after each major column specifies the acts making up the move in question. The two remaining moves, Frame and Focus, are indicated in the major columns whenever they occur. One horizontal line marks the end of the exchange, and two horizontal lines mark the end of the transaction. A dotted line indicates the beginning of a bound exchange. The example should be read from the column on the left to the column on the right, one exchange at a time.

Exchange Type	Opening	Act	Responding	Act	Follow-up	Act
Elicit (Pause)	Meg: Is that you, Petey?	el				
Bound initiation	Meg: Petey?	sum	Petey:What?	acc		
Re-initiation	Meg: Is that you?	el	Petey: Yes, it's me.	rep		
Elicit (Her face appears at the hatch)	Meg: What? Are you back?	el	Petey:Yes.	rep		
Inform (She disappears and reappears)	Meg: I've got your cornflakes ready.	i				
Inform	Meg: Here's your cornflakes.	i				
(He rises and takes the plate from her, sits at the table, props up the paper and begins to eat. Meg enters by the kitchen door)						
Elicit	Meg: Are they nice?	el	Petey:Very nice.	rep	Meg: I thought they'd be nice.	com

Example 1. Pinter BP:19.

2. Discourse cohesion

A discourse-analytical framework provides the text with a linguistic structure. Within this structure special kinds of cohesion exist, which I shall here call d i s c o u r s e c o h e s i o n. Discourse cohesion can be approximately compared to grammatical cohesion, grammatical parallelism, structural similarity; to enation and agnation (cf. Gutwinski 1976), but on the level of discourse. Discourse cohesion occurs only between discourse units, and mainly within predictive structures: (a) between the moves within an exchange, (b) between exchanges and the following bound exchanges, (c) between exchanges within sequences.

2.1. Discourse analysis specifies three major classes of move, Opening, Responding and Follow-up. The Opening move sets up certain constraints and expectations which the Responding move should fulfil. For any Opening move there is a range of predictable responses which exactly fit the expectations:

(2) elicit - reply
inform - acknowledge
request - reply
suggest - response
ritual - ritual
accuse - excuse
challenge - response

Moreover, if a Follow-up move occurs, it is either an Acknowledgement or a Comment, as is a possible second Follow-up move as well.

In the case of the first three exchanges in (2) especially, the absence of the second-pair part is immediately noticeable (for example not responding to a greeting). So, although the discourse is coherent by definition, only a certain response, or feedback makes up a structurally cohesive entity (cf. for example the elicit-reply structures in the exchanges in Example 1). Against this pattern of exchange structure other exceptions also stand out: initiations left without a response, and initiations challenged.

Example 2 illustrates discourse cohesion within exchanges consisting of three parts:

Exchange type	Opening	Act	Responding	Act	Follow-up	Act
Elicit	Goldberg:What's his name?	el	Meg:Stanley Webber.	rep	Goldberg: Oh yes?	ack
Elicit	Goldberg:Does he work here?	el	Meg:He used to work.	rep	Goldberg: Oh yes?	ack
			He used to be a pianist.	com	On the pier, eh?	com
			In a concert party on the pier.	com		

Example 2. Pinter BP:41.

2.2. Besides horizontal links, vertical linkage also occurs. Exchanges can be tied to one another; i.e. an exchange can be followed by a bound exchange. Figure 4 shows how discourse cohesion operates along the two axes.

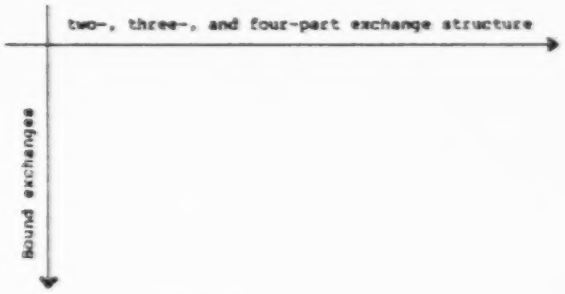
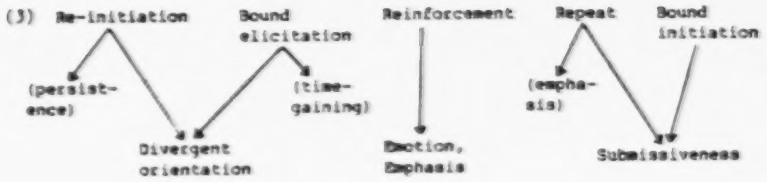


Figure 4.

As was mentioned earlier, there are five types of bound exchange: Re-initiation occurs when the speaker does not get a response and he makes another initiation; Reinforcement takes place when the bound exchange is related to the previous exchange in terms of its topic, and emphasizes it by rephrasing; Bound elicitations occur when the listener asks for more information; and Repeats are, in most cases, made up of the words of the previous speaker.

Bound exchanges have functions of their own; which can be seen from the following scheme:



Example 3 exemplifies Reinforcing, Re-initiating and Repeating exchanges:

Exchange type	Opening	Act
Elicit	Goldberg: Did you stir properly?	el
Reinforcement	Goldberg: Did they fizz?	el
Challenge	Stanley: Now, now, wait, you --	cha
Re-initiation	Goldberg: Did they fizz?	el
Re-initiation	Goldberg: Did they fizz or didn't they fizz?	el
Announce	McCann: He doesn't know!	ann
Repeat	Goldberg: You don't know.	acc

Example 3. Pinter BP:58.

2.3. Discourse cohesion is obvious in sequences in which the main distinguishing criteria are recurring characteristic linguistic patterns. Example 4 shows a sequence where discourse cohesion is created by a flow of Bound initiations:

Exchange type	Opening	Act
Inform	McCann: We'll provide the skipping rope.	i
Bound initiation	Goldberg: The vest and pants.	i
Bound initiation	McCann: The ointment.	i
Bound initiation	Goldberg: The hot poultice.	i
Bound initiation	McCann: The fingerstall.	i
Bound initiation	Goldberg: The abdomen belt.	i
Bound initiation	McCann: The ear plugs.	i
Bound initiation	Goldberg: The baby powder.	i
Bound initiation	McCann: The back scratcher.	i

etc.

Example 4. Pinter BP:93.

2.4. A special kind of discourse cohesion occurs when monologues are tied to the preceding and succeeding conversation. This is done by p l a n e c h a n g e s . The original idea of a plane change comes from Sinclair & Coulthard (1975:45), and is further developed by Montgomery (1978). The idea is that the speaker suddenly stands for a moment outside the discourse and makes an initiation that breaks the flow of the monologue, and links it to the conversation. Four kinds of plane change are distinguished:

(4) 1. one of the characters present is being addressed,
2. rhetorical questions without answers,
3. rhetorical questions with answers,
4. interruptions by other characters, or
5. an unknown person is being addressed.

There is usually a plane change at the beginning and at the end of the monologue, and often in the middle as well. The following extract shows examples of plane changes 1, 3, and 4:

Inform	Goldberg: Listen to this. Friday, of an afternoon, I'd take myself for a little constitutional, down the park.			
	PLANE CHANGE 1			
Direct	Eh, do me a favour, just sit on the table a minute, will you?			
(Lulu sits on the table. He stretches and continues)				
Inform	A little constitutional. I'd say hullo to the little boys, the little girls -- I never made distinctions -- and then back I'd go, back to my bungalow with the flat roof. "Simey", my wife used to shout, "Quick, before it gets cold!"			
	PLANE CHANGE 3			
Elicit	And there on the table what would I see?		Response The nicest piece of rollmop and pickled cucumber you could wish to find on a plate.	
	PLANE CHANGE 5			
Suggest	Lulu: I thought your name was Nat.	sug	Goldberg: She called me Simey.	res

Example 5. Pinter BP:69.

3. Cohesion

Although discourse analysis provides a piece of text with a structure, neither it nor discourse cohesion can account for the semantic unity of the text. This is where cohesion is needed to complement the analysis. The continuity that cohesion provides is created by the fact that at each stage of the discourse, cohesion expresses the points of contact with what has previously taken place in that discourse. However, a new problem is created by taking cohesion into account: what exactly are the units of language that cohesion links together?

The scope and applicability of the notion 'sentence' seem to create difficulties in the treatments of the distinction between discourse and cohesion. For Halliday & Hasan the category of 'sentence' is an important component in their approach to cohesion. In their view, structure accounts for the formation of sentences but not for the organisation of texts; within the sentence it is possible to specify a limited number of possible structures, but this is not possible for a text. So cohesion with its devices of substitution, reference, ellipsis etc. is invoked to account, in semantic, not structural, terms, for the interrelationships between sentences.

This, however, leads them to argue that only those devices operating across sentence boundaries are intrinsically cohesive: within the sentence such devices are only a secondary source of texture. The primary source of texture within the sentence is the structure itself; cohesive ties between sentences stand out more clearly because they are the only sources of texture, whereas within the sentence there are structural relations as well.

In studying extended passages of text, however, it seems clear that texture is created by the interplay of all the various cohesive devices, irrespective of whether they are sentential or intersentential. This is especially true of reference, substitution, and lexical cohesion, where chains or strings of items create a continuous thread through texts both within and between sentences.

Montgomery (1978) argues that some aspects of cohesion are not simply a matter of intersentential connection but may in fact reflect patterns of discourse. Certain items can mark or signal a relationship between more large-scale components of text. The items themselves can be seen as hanging on a line, from those linking small-scale units, such as substitution, to those indicating cohesion by various forms of conjunction and extended text reference. Montgomery proposes a tentative distinction between 'micro' and 'macro' cohesion as a way of representing that cohesive devices can have varying domains. The devices themselves are seen as reflexes in the lexico-grammatical systems of the language-discourse patterning. They are thus seen as representing the formal features or surface markers of discourse structure. He proposes a model of discourse structure with three layers, Member, Period and Episode, and the division of the discourse into Main and Subsidiary (cf. Montgomery 1978 for the details). Main discourse develops through a chain of Informing members which are frequently linked together by a limited range of conjunctive items such as and, so, but, or, so that.

As in Montgomery (1978), this paper also argues that cohesion basically works between the smallest discourse units, between acts. Since the method of analysis is based on a rank-scale system, the act being the basic cohesive unit, cohesion occurs both within and between discourse units.

An example of cohesion between the acts within a move is the exchange in Example 6.

Exchange type	Opening	Act	Responding	Act	Follow-up	Act
Boundary	1 Ben: Kawi	m -				
Inform	1 Ben:What about this? 2 Listen to this! 3 A man of 87 wanted to cross the road. 4 But there was a lot of traffic see. 5 He could not see how he was going to squeeze through. 6 So he crawled under a lorry.	st st 1 adv3 add4 cau				
Bound elicitation	7 Gus: He what?	qu*	8 Ben:He crawled under a lorry. 9 A stationary lorry.	clar qual3	10 Gus:No?	ack

Example 6. Pinter DW:30.

[*] qu = Query
qual = Qualification

The research by Winter (1977), Montgomery (1978) and Burton (1978) is the basis on which the present system of cohesion between acts has been modelled. Cohesive chains are there first discussed within exchanges, and, if the exchange is followed by one or more bound exchanges, within the entity which they comprise. Acts are numbered starting from the first act of the exchange, and finishing with the last act of the exchange, or of the bound exchange. If the head of the initiating move (cf. Example 6) is followed by post-head acts, these are coded as being cohesive with the head or with one of the post-heads in three ways: Additive (add), Adversative (adv) and Causative (cau).

Besides relatedness of form, which is realized both by discourse cohesion and the three cohesive relations within exchanges, relatedness of reference and relatedness of connection (cf. Halliday & Hasan) are most obvious within the transaction. A transaction is cohesive by definition, since it was defined as approximately consisting of one topic. Example 7 shows the cohesive relations and types of cohesion in three transactions:

Exchange type	Opening	Act	Responding	Act	Follow-up	Act
Inform	1 Meg: (coming downstage) The car's gone.	i	2 Petey: Yes.	ack		
Elicit	3 Meg:Have they gone?	el	4 Petey: Yes.	rep		
Elicit	5 Meg:Won't they be in for lunch?	el	6 Petey:No.	rep	7 Meg:Oh, what a shame.	com
(She puts her bag on the table) Inform	1 Meg:It's hot out.	i				
(She hangs her coat on a hook) Elicit	1 Meg:What are you doing?	el	2 Petey: Reading.	rep		
Elicit	3 Meg: Is it good?	el	4 Petey: All right.	rep		
(She sits by the table)						

Example 7. Pinter BP:96.

Employing the types of cohesion distinguished by Halliday and Hasan, the relations shown in Table 1 can be found.

Act No	No of ties	Cohesive item	Type	Distance	Presupposed item
1	1	the	R.2.23		the car
2	1	yes	E.33.2	0	Act 1
3	2	gone	L.1	M.1	gone
		they	R.14		
4	2	yes	L.1	M.1	yes
		yes	E.34.6	0	Act 3
5	1	they	R.14	M.1	they
6	1	no	E.34.6	0	Act 5
7	1	what a shame	C.48.1	0	Act 6
1	0				
1	0				
2	1	reading	E.21.1	0	Act 1
3	1	it	R.1.13	0	reading
4	1	all right	E.34.6	0	it

Table 1.

The first word in Example 7 seem to indicate that there are cohesive links from one transaction to another as well. With the help of discourse units, it is a comparatively easy task to discuss cohesion between larger units of language, between transactions and interactions. For example The Birthday Party has been found to consist of 19 interactions. Each interaction consists of a certain number of transactions which again consist of a certain number of exchanges. Thus, the rigorous frame created by discourse analysis will be useful for a systematic coding of cohesive links.

4. Conclusion

The paper has discussed how the underlying coherence of discourse is realized first by different discourse units, and how these are tied to continuous discourse by the devices of cohesion. Both of these complementary approaches, coherence and cohesion, are needed if a thorough examination of discourse is to be successful. Furthermore, by using the discourse-analytical framework together with the cohesive devices, it is possible to make rigorous (socio)linguistic analyses of texts of any length.

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SOME OBSERVATIONS ON COHESION AND COHERENCE IN SIMPLIFIED TEXTS

by

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1. Introduction

This paper relates to Lautamatti (1978) which discusses the development of the discourse topic in simplified discourse. The texts to be analysed are the same as in the previous study. They have been produced, on the basis of an original text, by language teachers and linguists for the purposes of teaching reading comprehension to foreign, university-level learners of ESP.[1]

By simplification we mean in this paper a procedure by which authentic informative texts (i.e., texts produced for the purpose of transmitting information in a certain field of study) are modified for language teaching purposes, generally by language teachers themselves. The process is based to a great extent on the simplifier's experience as a language teacher and on his intuitions about language. The most obvious features to change in simplification are sentence length, vocabulary, and syntactic structures.[2]

[1] Some of the simplifiers point out, however, that the foreign language skills of university-level students vary greatly from one country and culture to another. Their varying experiences as teachers may thus explain the different levels of the simplifications they produced.

[2] But see Schlesinger (1968), who, on the basis of experimental results, argues for the importance of semantic factors in the comprehension of syntactic structures.

Readability indices are commonly based on these, and so, according to Mountford (1976:143-4) is the production of simplified readers. Less is known about other types of changes brought about by simplification of written discourse[3], whereas simplified forms of spoken language have received a fair amount of attention lately e.g., baby and foreigner talk, pidgins, immigrant workers' language, and interlanguage.

In this paper we shall discuss changes in cohesion and coherence caused by simplification, and their possible relevance for the reading process. Since the material analysed is very limited, the results of the analysis are offered as a starting-point for discussion and further work, not in any way as conclusive facts.

2. Theoretical background

The term cohesion is used in the way of Halliday & Hasan (1976) (see also Gutwinski 1976). They define cohesion as a network of non-structural (structural being used in the sense 'restricted to the clause'), semantic, text-forming relations (Halliday & Hasan 1976:7). They consider a text a semantic unit, realized by a sequence of sentences, and see cohesion as a means of providing continuity on a semantic, textual level; whereas grammatical structuring is used to the same effect at the level of sentences, clauses, etc. (Halliday & Hasan 1976:293). This distinction between above-sentence and below-sentence properties is also made by Gutwinski (1976:49). It seems, however, that this view may be a kind of over-reaction to earlier treatments of the sentence as the basic grammatical unit of language, and has lead to a somewhat arbitrary distinction. The position of sentences as intermediaries between grammatical and semantic continuity seems less clear-cut than what has been proposed in the theory of cohesion. However, in this paper we will restrict the study of cohesion to intersentential features. (The term sentence is used in the sense of 'text-sentence', cf. Lyons 1977: 622.) Intersentential analysis was considered a better starting-point here than inter-clausal, since properties of sentences and clauses are part of the foreign language learner's knowledge of the foreign language, while the effect of intersentential, i.e., actual text-forming, features, receives less emphasis in language teaching.

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[3] Mountford (1976) discusses the need for a theory or model of discourse which would take into account both the linguistic structure of the text and its rhetorical structure as a piece of discourse. Lautamatti (1978) discusses the development of the discourse topic in simplified discourse by comparing a group of simplified texts.

In the system of Halliday and Hasan, the main categories of linguistic devices by which cohesion is expressed, are the following:

- reference (pronominal, demonstrative, etc.)
- substitution (with so, do, etc.)
- ellipsis (nominal, verbal, clausal)
- conjunction (devices indicating relationships between clauses and sentences)
- lexical cohesion (repetition of lexical items, synonyms, collocation, i.e., association of lexical items that regularly co-occur).

While Halliday & Hasan consider cohesion as a necessary but not sufficient factor in creating a text (Halliday & Hasan 1976:298-99; similarly Gutwinski 1976:33), Widdowson (1977a:160) points out that this is not always the case. In spoken language, dialogues like the following form a unity without cohesion (Widdowson 1977a:165):

(1) A: Doorbell!
B: I'm in the bath.
A: OK.

The theory of cohesion would seem inadequate to handle this kind of text, which makes little sense as a linguistic sequence of sentences. Its interpretation must be based on its character as an act of communication consisting of utterances in a context. (Widdowson 1977a, and Mountford 1976:146 distinguish between the two approaches by speaking of text and discourse, respectively, but for this paper it has proved impractical to restrict the sense of 'text' in this way.) In written informative texts the communicative unity of utterances, which Widdowson calls coherence, may be rare or impossible without cohesion, but the distinction is still valid. As a piece of discourse of communicative language, a written text has both cohesion and coherence, the latter being its structure as a sequnce of acts of communication (see also Mountford 1976:146-7).

For effective communication, the information in written texts is usually presented in a form which helps the reader to process it, to evaluate it, and to relate it to earlier information, and this form may thus be considered part of its coherence. For this purpose writers use different types of non-topical material, i.e., material not directly related to the subject-matter or topic of discourse (Lautamatti 1978). This material contains aids like discourse organisers, illocution markers (indicating to what purpose something is asserted), modality markers (indicating the truth value of what is said), metatextual markers (commenting on the language itself), metalinguistic markers (commenting on language items), and the

writer's personal commentary. While most discourse organisers would seem to coincide with Halliday & Hasan's category of conjunction (though the former category seems to be more inclusive), the other non-topical types are not dealt with in their system. Of course, they may be linked by cohesive ties, as in Scientists suggest... .They claim..., but the system does not keep them apart as markers of textual coherence.

The implication of a distinction between cohesion and coherence is obvious. If the aim of simplification is to make a passage more easily comprehensible, or, in Widdowson's words, to "adjust [the language user's] language behaviour in the interests of communicative effectiveness" (Widdowson 1977b), it should optimally include also those aspects of discourse which are used to facilitate communication (Mountford 1976:146ff; Widdowson 1977b).

However, as was pointed out earlier, studies of simplification show that the simplification process is generally carried out by changing the lexicon, the syntactic structures and the length of sentences, i.e., it seems to affect mainly the topical material. The framework within which the information is presented --its relatedness to earlier information, its truth value, its internal organisation-- may seem to make a text more, not less, difficult to read, and is consequently omitted or reduced. After all, inclusion of non-topical material means lengthening of sentences, more complex syntactic structures, and possibly a fairly high level of abstraction. If the simplifier is a language teacher, not an expert of the field, he may naturally feel unqualified to handle elements of the text which relate to the value, relevance, or structure of the information.

3. The procedure

Cohesion and coherence, then, are examined here as part of the semantic and communicative structure of the text, likely to undergo changes in the process of simplification. To obtain simplified texts, a number of language teachers and linguists were asked to simplify a piece of authentic informative writing. They all received the following instruction: "Simplify the following text preserving its character as a piece of discourse, to make it more readable for foreign language students on tertiary level of education."

Out of the simplifications produced, four were rewritings of the original text (OT), and were thus suitable for our analysis. Furthermore, these simplified texts (ST1, ST2, ST3, and ST4) were produced by native

speakers of English. The texts have been appendixed.

The following features in the texts were analysed:

- the over-all number of all cohesive ties compared with the number of sentences and words in each text,
- the number of lexical ties, referential ties and conjunctions per number of sentences and number of words. Only intersentential conjunctions have been counted. Substitution and ellipsis as cohesive devices have been excluded, since their use in written informative texts seems to be rather infrequent,
- frequency of different types of ties,
- distance of ties from their antecedents,
- number and type of non-topical material (discourse organisers, modality markers, illocution markers, metalinguistic and metatextual markers, writer's commentary).

Only one instance of each tie per sentence has been counted, though it is questionable whether this is the best approach. After all, a cohesive item may be considered to tie with the antecedents every time it appears in a sentence. The analysis of cohesion has been carried out according to the system used in Halliday & Hasan (1976). The discussion will be illustrated with examples from the texts.

4. Results and discussion

4.1. First, some general trends in STs shall be pointed out. As shown in Table 1, the number of words per text, as well as the average number of words per sentence has decreased. On the basis of previous research this was to be expected. The amount of reduction, however, depends on the strategy of simplication used. As has been shown elsewhere, ST1 represents a strategy of simplification which uses short sentences generally only with a succession of main clauses in place of complex sentences. This, furthermore, leads to the development of a number of new subtopics (Lautamatti 1978). Thus the number of sentences, which in the other STs remains very close to the original, is doubled in ST1. This also explains the relatively smaller decrease in the number of words in ST1. Similarly, ST1 differs from the rest of the texts in that the average number of words per sentence has decreased more than in the others. ST3, on the other hand, represents a simplification strategy where sentence structure and topical structures (as defined in Lautamatti 1978) have been retained very much unaltered, while the simplification is based on reduction of modifiers and the use of more

	OT	ST1	ST2	ST3	ST4
number of words	352	324	238	201	240
number of sentences	10	20	11	10	11
words per sentence	35.2	16.2	21.6	20.1	21.8

Table 1.

Changes in number of words, number of sentences, and number of words per sentence in simplified texts.

concrete concepts. This is reflected in the great decrease of the number of words (almost one half) in the text as a whole and in the individual sentences.

4.2. Simplification does not seem to affect the relative frequency of cohesive ties in these texts (cf. Table 2). Thus the number of ties per number of words remains almost the same, except in ST1, where it is slightly higher. The figures showing the number of ties per sentence are naturally lower for STs, where the sentences are shorter than in OT. In ST1, the higher figures may again reflect the different strategy of simplification.

	OT	ST1	ST2	ST3	ST4
number of cohesive ties	77	122	57	41	56
number of cohesive ties per number of words	0.21	0.37	0.24	0.20	0.23
number of cohesive ties per number of sentences	7.7	6.1	5.2	4.1	5.1

Table 2.

Total number of cohesive ties and their distribution per number of words, and per number of sentences.

The chopping up of compound sentences into several short ones retains the number of intersentential ties to a higher extent than in the other STs, and increases the absolute frequency of ties as compared with OT.

The following example is a case in point:

(2) OT: This helplessness of human infants is in marked contrast with the capacity of many new born animals to get to their feet within minutes of birth and run with the herd within a few hours. (S. 5)

ST1: Human babies are unusual in this characteristic, if we compare humans to other animal species. Many new-born animals can stand on

their feet very soon after being born. Often they can run with the herd a few hours later. (S. 7-9)

4.3. In the use of different types of ties some trends may also be observed (cf. Table 3). In all STs, the proportion of lexical ties slightly decreases and that of grammatical ties (reference and conjunction) slightly increases. Also, in the category of lexical cohesion there is a general trend towards a relative increase of repetition of lexical items in all texts except ST2.

	OT	ST1	ST2	ST3	ST4
LEXICAL total	88.3	82.8	84.2	78.0	78.6
of this:					
repetition	48.5	76.2	43.8	65.6	54.5
synonyms, near-synonyms, same root	26.5	12.9	29.2	18.8	22.7
collocations, superordinates	19.1	10.9	18.8	12.5	18.2
antonyms	5.9	-	8.3	3.1	4.5
GRAMMATICAL total	11.7	17.2	15.8	22.0	21.4
of this:					
reference	77.8	95.2	66.7	77.8	91.7
pronominalisations	14.3	30.0	33.3	28.6	36.4
definite article, demonstratives	71.4	60.0	66.7	57.1	54.5
comparatives	14.3	10.0	-	14.3	9.1
conjunction	22.2	4.8	33.3	22.2	8.3

Table 3.

Types of cohesion and their frequency in percentages in the original text, and in the simplified texts.

4.3.1. The use of such types of lexical cohesion as synonyms, near-synonyms, and items from the same root as the antecedent, has decreased in all STs except ST2. Collocational items and the use of superordinate concepts have decreased in ST1 and ST3, while in ST2 and ST4 they are almost as frequent as in OT. The two tendencies, to diminish the proportion of lexical types of cohesion, and to increase the proportion of repetition

of items, support Mountford's findings of a "more transparent system of lexical cohesion" in simplified texts (Mountford 1976:155), and indicates a lowered type-token ratio of lexical items in simplified texts.

ST1 and ST2 show opposite patterns in the change of cohesive features. ST1 uses a great deal of direct repetition of items, while it greatly decreases the number of synonymous and collocational expressions. This seems to relate to the strategy of simplification in ST1: the use of simple short sentences obviously necessitates the development of an idea or subtopic over several sentences, which increases cohesion (cf. (2)). The figures may also reflect a tendency to restrict the vocabulary for the benefit of the reader. -- ST2 on the other hand, uses synonymous and collocational items proportionally more frequently than OT. This could be taken to mean that the simplifier has retained much of the original lexical complexity, while relying on 'simplified topical development' (as defined in Lautamatti 1978), shortening of sentences, and reduction of subsidiary material to create a simplifying effect. To verify this, we would need a detailed comparison between ST2 and OT. The following passages will illustrate the point:

(3) OT: Although young animals are certainly at risk, sometimes for weeks or even months after birth, compared with the human infant they very quickly develop the capacity to fend for themselves. It would seem that this long period of vulnerability is the price that the human species has to pay for the very long period which fits man for survival as species. (S.6-7)

ST1: Young animals may get hurt and even die during their first year, but those that survive are able to look after themselves. A young human child takes much longer to look after himself. We must suppose that this long period of learning is necessary to allow the human race to survive as a species. (S.10-12)

ST2: Although animals remain vulnerable for attack for weeks, in some cases for months, after birth, they become able to survive without help much more quickly than human babies. Man's survival as a species depends on this particularly long period of infant vulnerability. (S.6-7)

4.3.2. The proportion of grammatical cohesion has increased in all STs (cf. Table 3). This is mainly due to a greatly increased use of pronominal reference, i.e., reference by personal pronouns, possessive adjectives (Halliday & Hasan's determiners) and possessive pronouns. The

use of pronominal reference is natural in the situation of foreign language learning and teaching, where a closed system such as pronouns can be easily memorised. The increased use of pronominal reference in simplified texts may further be due to the greater clarity of reference in the STs, from which much of the subsidiary material has been omitted. In authentic texts the use of pronominal ties may be more liable to cause ambiguity of reference.

A reduction of ideas in STs also influences the type of cohesion that will be used later on in the text (cf. (4)).

(4) OT: Without care from some other human being or beings, be it mother, grandmother, sister, nurse, or human group, a child is very unlikely to survive. (S.4)

ST3: Without help from other human beings the baby is unlikely to live (S.4)

Here the reduction of subordinate ideas leaves only those lexical items which carry the main information. Consequently, later references will be easier to trace, particularly if they occur in the form of a repetition of the lexical item, or of pronominal reference. Thus, where OT has the sequence a human infant - new born children - the new born child - a child (1-4), ST3 has a baby - it - it - the baby (1-4).

On the other hand, cohesion based on the use of demonstratives, definite articles, or comparative expressions such as other, more, etc., has slightly decreased in the STs. One possible explanation might be the general decrease in subsidiary material, as in (4). This would imply that there is a kind of hierarchy in the referential force of pronouns and demonstratives, a hypothesis that cannot be investigated here.

The use of conjunctions in simplified texts varies. It has decreased greatly in ST1 and ST4, increased in ST2, and remains unaltered in ST3. This raises some questions, first about the adequacy of the category itself, and, secondly, about the significance of conjunctions for reading comprehension. On the basis of the present analysis it seems that Halliday & Hasan's category of conjunctions should be extended to include all types of discourse organising material, e.g., cases where the original first... secondly is replaced by the first (feature)....the second (feature), etc. Secondly, even with this adjustment, ST1 uses -- relatively speaking -- far fewer conjunctions per number of sentences than the original. This indicates that the relationships which in OT are expressed by conjunctions and syntactical hierarchies are now left for the reader to infer from a sequence of syntactically simple sentences with a relatively complicated

development of subtopics.

Can this be considered to aid reading comprehension? There is earlier evidence that the facilitating effect on recall of information, and, by implication, on reading comprehension, of this type of organising material may have been overestimated (Meyer 1975:157ff., and Urquhart 1976).-- Meyer's results, however, have been obtained with native speakers of English, and Urquhart was also dealing with university students of English, whose language skills may have been fairly advanced. In both groups, then, the readers were presumably capable of taking advantage of redundancy on the topical level, and thus needed less support from the organising material. It still remains to find out whether students at lower levels of language learning could be trained to develop reading skills where the organising material is actually used to aid reading comprehension, not only, as Meyer (1975:158) suggests of some types, to aid the writer to organise his ideas.

4.4. Table 4, finally, shows the percentages of ties at different distances from their antecedents. As can be seen, there is little consistency in the changes. It seems likely that this is a feature which corresponds closely to the strategy of development of the discourse topic and its subtopics. Halliday & Hasan (1976:296) refer to these characteristics of the text with the term texture, and write: "Characteristically we find variation in texture, so that textuality is a matter of more or less. In some instances there will in fact be dense clusters of cohesive ties, giving a very close texture which serves to signal that the meanings of the parts are strongly interdependent and that the whole forms a single unity." They also suggest that paragraphs could be expected to form unities of this kind in written texts.

Distance	OT	ST1	ST2	ST3	ST 4
0 - 1	80.5	60.6	80.7	70.7	82.1
mediated 0 - 2	6.5	8.1	5.2	12.1	1.7
over 5	9.0	13.1	3.5	9.7	8.9

Table 4.
Distances of ties and their antecedents shown as percentages.

The observations of the STs studied here support Halliday & Hasan's ideas. ST1, with its individual way of developing the discourse topic, also

presents a pattern of cohesive distances which differs from the other texts. In it, the proportion of cases with the distance between 0 and 1 (the antecedent in the previous or next to previous sentence) has decreased, while the proportion of cases where the tie is mediated over two sentences or where it occurs at the distance of 5 or more, has increased. This seems, again, to reflect the strategy of creating a sequence of separate simple sentences to deal with information which in OT is expressed with longer, complex sentences.

4.5. Altogether, the results that have been presented above, though in no way conclusive, support earlier observations that there is an intuitive tendency in the simplification of informative texts to reduce the degree of semantic information. This is done, e.g., by avoiding reference with lexical items which add something to the concept referred to, that is, with synonyms, near-synonyms, or, in some texts, collocational items. These types of ties are replaced by an increasing number of repetition and pronominal ties. The generally observed shortening of sentences and of the whole text would point to the same phenomenon: information which is felt to be redundant is deleted, and at the same time the general level of abstraction is lowered, e.g., baby is used instead of human infant.

This observation makes one ask how redundant, in fact, the information is that has been lost in the process of simplication. It might be possible to test the loss of factual information by using a reading comprehension test on OT and the STs, with test questions based on OT. But there is more to the matter than the loss of factual information. Part of the message is, perhaps, contained in the manner the information is presented and the concepts that are used. To take a trivial example: the use of a concept like 'human infant' prepares the reader for a certain level of discussion, creating anticipation, even if unconscious, of a conceptual network typical to psychological, educational or medical discourse. On the other hand, the concept of 'baby' -- as a lexical entry no doubt almost synonymous with human infant -- more readily associates with ideas like 'cry', 'nappy', or 'feed'. For the student, the terms used may convey essential features of the conceptual apparatus used in a particular field of study, and thus link up with other texts using even more sophisticated concepts. It seems that in this respect there is a definite difference between, say, ST3 and ST4. We could say, in fact, that at least ST3 represents a different type of discourse from OT in terms of the relationship of the sender and the receiver of the message. This is an area where the theory of cohesion is of

obvious relevance for ESP teaching.

4.6. It remains to examine the changes caused by simplification in the use of non-topical types of material. The use of discourse organisers was discussed in connection with conjunction, on p. 173 - 4 above. Of the other types of non-topical markers, only modality markers appear in OT. Their treatment in the STs support Mountford's findings: there is a slight but consistent decrease in the use of non-topical markers like it seems that... we must suppose that... etc. per number of sentences: OT 5/10; ST1 6/20; ST2 2/11; ST3 2/10; and ST4 2/10. This supports the hypothesis presented above on p. 168 that in simplification syntactical considerations and considerations of sentence length override aspects of scientific rhetorics. -- It should be noted, however, that both ST2 and ST4 a d d a meta-linguistic marker to the text (The use of this term means...in ST2, and By this they mean... in ST4). It is tempting to see this as an indication of the simplifiers' (who are all language experts) wish to facilitate communication in their own area of expertise: linguistic explanation.

5. Final remarks

On the basis of the observations above we could say that in the texts analysed, simplification has affected both textual cohesion and coherence. Thus, simplification tends to restrict the degree of semantic information and to establish a more transparent pattern of reference in the text. The use of cohesive conjunctions varies inconsistently, while the use of modality markers has slightly decreased. Also, some simplifiers have added metalinguistic markers in the text.

The results would indicate a need for further research in some areas. One such area is the use of various discourse organisers and their role in reading comprehension. While earlier results seem to suggest that their value as reading aids has been overestimated, the results might be different if FL students were specifically trained to make use of organisers of this type.

Furthermore, we need to know more about the effect on the information content of a text of the reduction of semantic information dimensions. This reduction can be seen in the decrease of the number of synonymous, near-synonymous or collocational ties, and of redundant modifiers. Similarly, the effect of the lowering of the level of abstraction needs further investigation. In this area, comparison of simplifications produced by

language experts and experts of the particular field of study might give us further insights into what, from the point of view of the academic field concerned, is redundant and what is not.

One further problem is the treatment of non-topical material in simplified texts. If 'authenticity' of discourse is considered to be of value for the FL student, syntactic and semantic complexity may at times by unavoidable. This complexity alone makes possible a natural inclusion of material which helps the reader to process the meanings of the text, not as isolated facts, but as information relating to extra-textual phenomena, and so turns the text into an act of scientific communication.

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APPENDIX

ORIGINAL TEXT (OT)*

(1) When a human infant is born into any community in any part of the world it has two things in common with any other infant, provided neither of them has been damaged in any way either before or during birth. (2) Firstly, and most obviously, new born children are completely helpless. (3) Apart from a powerful capacity to draw attention to their helplessness by using sound there is nothing the new born child can do to ensure his own survival. (4) Without care from some other human being or beings, be it mother, grandmother, sister, nurse, or human group, a child is very unlikely to survive. (5) This helplessness of human infants is in marked contrast with the capacity of many new born animals to get to their feet within minutes of birth and run with the herd within a few hours. (6) Although young animals are certainly at risk, sometimes for weeks or even months after birth, compared with the human infant they very quickly develop the capacity to fend for themselves. (7) It would seem that this long period of vulnerability is the price that the human species has to pay for the very long period which fits man for survival as species.

(8) It is during this very long period in which the human infant is totally dependent on others that it reveals the second feature which it shares with all other undamaged human infants, a capacity to learn language. (9) For this reason, biologists now suggest that language is 'species specific' to the human race, that is to say, they consider the human infant to be genetically programmed in such a way that it can acquire language. (10) This suggestion implies that just as human beings are designed to see three-dimensionally and in colour, and just as they are designed to stand upright rather than to move on all fours, so they are designed to learn and use language as part of their normal development as well-formed human beings.

[*] Anne and Peter Doughty, Language and Community. Edward Arnold, London 1974.
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SIMPLIFIED TEXT 1 (ST1)

(1) All healthy, new-born babies, in all countries of the world, share two characteristics.

(2) The first characteristic which all human babies share, is that they are completely helpless. (3) The only thing they can do to persuade someone to look after them is to cry, and in this way they can draw attention to themselves. (4) A helpless baby will only survive if another human-being looks after it. (5) The other human-being need not necessarily be the mother. (6) A grandmother, sister, or someone who is not related to the child, may care for it.

(7) Human babies are unusual in this characteristic, if we compare humans to other animal species. (8) Many new-born animals can stand on their feet very soon after being born. (9) Often they can run with the herd a few hours later. (10) Young animals may get hurt and even die during their first year, but those that survive are able to look after themselves. (11) A young human child takes much longer to learn to look after itself. (12) We must suppose that this long period of learning is necessary to allow the human race to survive as a species.

(13) The second characteristic which human babies share, develops

during the long period of learning to survive. (14) This characteristic is the ability to learn language and it is shared by all babies who have normal, healthy brains. (15) Biologists suggest that learning language, during this time, while the young child cannot look after itself, is an ability which is only found in the human species. (16) They suggest that the human brain is specially designed to allow human beings to learn language. (17) We know already that human eyes are designed to see the world in colour and to recognise whether objects are solid or not. (18) We also know that human skeletons are designed to allow people to walk upright on two feet, and not use their hands as well. (19) Just as these are specially human characteristics, so, the scientists suggest, the ability to learn language is a specially human characteristic. (20) The human species is able to survive because all normal human beings are able to learn and to use language.

SIMPLIFIED TEXT 2 (ST2)

(1) At birth, all babies have two things in common with each other, wherever and whenever they are born. (2) (This is not true if the baby is in any way damaged.) (3) First, a new-born baby is unable to survive without help. (4) All he can do is to cry, which may attract the attention of those who can help him to survive -- his mother, grandmother, sister, nurse and so forth. (5) New-born animals, on the other hand, can stand on their feet very soon after birth and run with their herd a few hours later. (6) Although animals remain vulnerable to attack for weeks, in some cases for months, after birth, they become able to survive without help very much more quickly than human babies. (7) Man's survival as a species depends on this particularly long period of infant vulnerability. (8) Secondly, all babies possess a capacity to learn language. (9) This capacity is revealed while the baby is still dependent on others for survival. (10) Biologists use the term "species specific" to describe how all undamaged human babies are genetically predisposed, or programmed, to the learning of a language. (11) The use of this term means that learning to speak a language is part of the normal and natural development of an undamaged human being, in the same way that it is normal to see in three dimensions and in colour, (and) in the same way that it is normal for a man to stand upright.

SIMPLIFIED TEXT 3 (ST3)

(1) When a baby is born (into any community anywhere) it has two things which it shares with all babies, providing none of them have suffered any damage. (2) First, it will be helpless. (3) And, apart from crying to attract attention, there is nothing it can do to change this helplessness. (4) Without help from other human beings the baby is unlikely to live.

(5) A baby's helplessness contrasts with the ability many young animals have -- the ability to stand up a few minutes after birth and to run a few hours later. (6) Although these young animals are in danger for some time after their birth they can help themselves much better than human babies. (7) It seems that humans have to pay for their long period of development with a long period of helplessness.

(8) It is during this period (when the baby is totally dependent) that it shows the second thing it shares with all babies -- the ability to learn a language. (9) Biologists now suggest that normal humans automatically learn a language. (10) Babies learn language because they are designed to learn one as part of their normal development, just as they are designed to see in three dimensions and in colour, and to stand upright.

SIMPLIFIED TEXT 4 (ST4)

(1) All human infants, wherever they are born, are alike in two respects, so long as they are not damaged in some way before or after birth. (2) Firstly, and most obviously, new-born infants are completely helpless. (3) They are able to draw attention to themselves by crying, but, apart from this, can do nothing to ensure their own survival. (4) They depend entirely upon other human beings, such as mother, grandmother, sister, nurse and so on. (5) Without the care of these they are unlikely to survive. (6) In this respect, human infants are unlike many new born animals, which sometimes need to get to their feet and run with the herd within minutes of birth. (7) For humans, the long period of nurturing which fits man for survival as a species means that there is an equally long period of dependence and therefore vulnerability.

(8) The second respect in which all human infants are alike is the capacity to learn language. (9) It is during the period of vulnerability that this capacity is exercised. (10) Because all undamaged human infants learn language, and no other creatures do, biologists say that language is 'species specific'. (11) By this they mean that the human infant is genetically programmed so that it can acquire language. (12) The learning of language is as much part of the normal development of human infants as, for instance, the ability to see three-dimensionally and in colour, or the characteristic of standing upright rather than going on all-fours.

FELICITY CONDITIONS, PREFERRED INTERPRETATIONS, AND DISAMBIGUATIONS OF PRONOMINAL REFERENCE IN REPORTED SPEECH

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1. Background

The starting-point of the present paper is the general observation that in the quest for referents for pronouns, one important criterion beside formal clues such as morphological agreement is contextual and pragmatic plausibility. As several linguists have pointed out, the preferred interpretations of formally ambiguous sentences such as

(1) (a) The guards shot at the prisoners and I saw several of them fall.
(b) The guards shot at the prisoners and I saw several of them turn away.
(c) The guards shot at the prisoners and I saw several of them escape.
(d) The guards shot at the prisoners and I saw several of them turn pale.
(e) The guards shot at the prisoners and I saw several of them fix their bayonets.

depend on our judgments of how the world is most likely to work. If guards shoot at prisoners, who, the guards or the prisoners, are more likely to fall, turn away, escape, turn pale, or fix their bayonets? When the

sentences are given out of context and in isolation, we have little difficulty in arriving at preferred interpretations for sentences such as (1a, b, c) and (e). (1d) is more abiguous, as both shooters and victims have good reasons to turn pale. It is, however, possible to change the interpretational plausibilities by the addition of new contextual and situational clues. Thus compare (1e) in isolation with the same sentence in context (1e'):

(1) (e') The guards shot at the prisoners and I saw several of them fix their bayonets. When raiding the prison store, the prisoners had succeeded in taking plenty of rifles and bayonets but no ammunition. Now they had to rely on cold steel and try a desperate bayonet charge in a hail of bullets.

In the following, I shall exemplify the effect of pragmatic plausability on interpretation. My examples will involve pronominal disambiguation with the aid of clues provided by the semantic properties of some reporting verbs.

2. Morphologic and pragmatic disambiguation

2.1. Standard grammars have long been preoccupied with the adjustments of pronouns, moods, tenses, deictics, adverbials, and perhaps even converses such as come and go in paraphrases of direct into reported speech and vice versa. Paraphrases such as

(2) (a) Yesterday John shouted through the window: "I must ask you to come out and help me with the boat, because I must go to town from the island tomorrow."

(b) Yesterday (one day last week, etc.) John shouted through the window that he had to ask me to go out and help him with the boat because he had to go to town from the island today (on the next day, etc.).

From a textual point of view, we can say that sentences with reported speech, or indirect discourse such as erlebte Rede or discours indirect libre, involve at least two layers of text: a frame, and a reported text. These have to be fused into one single linear string, where the frame becomes the matrix and the reported text is embedded into the matrix. Certain adjustments then take place in the embedding to make it harmonize with the matrix. These adjustments mark the fusion of the reported text into the frame. But at the same time they provide the receiver of the message with

cues that enable him to separate the two textual layers. To understand the message, the receiver must be able to reconstruct the original text layers out of the fused result: if he hears or reads (2b), he must be able to reconstruct (2a).

2.2. The reason why the disambiguation of third-person pronouns in reported speech is of particular interest is well-known. The adjustments involved in the embedding of direct quotations neutralize certain pronominal differences that are distinct in the quotations. Compare

(3) (a) John said to Peter: "I must go to town."
"You must go to town."
"He must go to town."
(b) John said to Peter that he had to go to town.

(3b) can be a paraphrase of all three sentences in (3a). If we change the pronoun of (3b) as in

(3) (c) John said to Peter that I had to go to town.
(d) John said to Peter that you had to go to town.

the I and you are no longer coreferential with the I and you in (3a): they no longer refer to John and Peter but to the persons who utter and receive sentences (3c) and (3d).

2.3. The clues disambiguating pronominal references in reported speech are of two kinds. First there are formal syntactic clues, including morphologically marked agreement between pronoun and referent, and relative order between pronoun and referent or potential referents. The relative places of pronouns and referents in the sentence structure as a whole may also affect the interpretation. Secondly there are pragmatic clues giving rise to preferential interpretations on grounds of degrees of plausability. Generally, morphological marking of agreement is hierarchically the strongest kind of clue and capable of overriding non-morphological and pragmatic clues. Thus in

(4) Alison told me that Bill would like her to shave her beard off.

the feminine her at once overrides the pragmatic likelihood that beard is

associated with Bill rather than with Alison. Formal agreement thus compels us to look for ways of ascribing beard to the girl, through metaphorical interpretation if no literal interpretation is available. Only as a last resort are we willing to dismiss the sentence as nonsense too deviant for any kind of interpretation.

To Auli Hakulinen I owe an even more dramatic example of preferred interpretation. The sentence

(5) (a) The dentist told the patient to try on his false teeth.

would presumably pass without a query though it is formally ambiguous. To give it its more newsworthy and pragmatically less likely interpretation, we must mark it in some contextually appropriate way, for instance as a newspaper headline,

(5) (b) Dentist Told Patient To Try On His False Teeth!!!

2.4. If the reporting is recursive and there are no contextual clues suggesting preferred interpretations, it becomes impossible to disentangle the referents and disambiguate the pronominal references. First and second-person pronouns in the singular are of course disambiguated thanks to the speech situation: the first person refers to the speaker and the second person to the addressee, irrespective of the depth of the embedding, as in

(6) (a) Alison told Betty that Charlie had said that Dorothy had told Eric that Francis had called me a fool.

(b) Alison told Betty that Charlie had said that Dorothy had told Eric that Francis had called you a fool.

If the first and second-person pronouns are in the plural, ambiguities may arise as to precisely who should be included in the group referred to by we and you. But with pronouns in the third person, in the absence of disambiguating features of a formal kind, the ambiguity is inherent not only in pragmatic reference but also in syntax. This will be so for instance in (6), which contains more than one possible male and more than one possible female referent:

(6) (c) Alison told Betty that Charlie had said that Dorothy had told Eric that Francis had called him/her a fool.

At this point, somebody may object that there is a limit as to how much such recursive reporting a real-life act of communication can tolerate. One answer would be that, in Chomskyan terms, such limits are matters of performance rather than of competence. For the present argument it is more relevant to note that the interpretability of sentences such as (6c) depends on contextual and situational plausibilities of the kind illustrated above in paragraphs 1 and 2.3. Thus (6c) would be far less ambiguous in a context such as

(6) (d) Mary: "John, do you know what Francis thinks of Alison? Does he think she is bright enough for the job?"
John: "I think not. Actually Alison told Betty that Charlie had said that Dorothy had told Eric that Francis had called her a fool. I don't think she should apply because she really hasn't a chance."

Whatever we think of the likelihood that such long strings of recursive embeddings would occur outside the grammarian's laboratory, (6d) is clear enough as to preferred interpretation: her obviously refers to Alison rather than to Dorothy. We might, then, say that (6d) is all right for clarity of meaning. If we wish to avoid using (6d) we presumably do so for reasons other than a fear of ambiguity -- such a cumbersome structure is, to begin with, likely to offend our sense of stylistic appropriateness.

3. Reporting verbs as disambiguators

3.1. So far, I have exemplified reporting verbs with tell, say, and call. All three yield few clues to the relations obtaining between the actants. In other words, all three are predicates placing relatively few constraints on the relations obtaining between their arguments. Thus anybody can 'tell' or 'say' someting to somebody else, given the physical means (a face-to-face contact or suitable apparatus such as a telephone). But there are reporting verbs whose semantics are specific enough to restrict the range of plausible interpretations. Compare

(7) (a) Alfred told Bert that Carl had called him a clever man.
(b) Alfred told Bert that the professor had called his thesis the best of the year.
(8) (a) Alfred boasted to Bert that Charlie had called him a clever man.

(b) Alfred boasted to Bert that the professor had called his thesis the best of the year.

In (7), him and his cannot be disambiguated without further context. In (8), however, the reporting verb, boasted, gives a clue towards disambiguation. To boast means to extol oneself, to be proud of something. When interpreting (8a) and (8b), we therefore try to find that pronoun-to-antecedent relationship which harmonizes best with Alfred's extolling himself. If (8a) is read in isolation, the most likely interpretation is that him refers to Alfred; only if we know that Alfred is somehow responsible for Bert's cleverness, and proud of it, are we justified in interpreting him as referring to Bert. Similarly his is likely to refer to Bert in (8b) only if Alfred feels responsible for the excellence of the thesis. Such extensive background knowledge is necessary if him and his in (8) are to be understood to refer to Bert rather than to Alfred.

3.2. The reasons why reporting verbs like boast have a strong pragmatic disambiguating power are inherent in the semantics of these verbs. Let us next look at some syntactically ambiguous instances with warn:

(9) (a) Alice warned Betty that she was in a filthy mood.
(b) Alice warned Betty that she was doing a dangerous thing.
(c) Alice warned Betty that Charlie had promised to divorce her.
(d) Alice warned Betty that she should be more careful in the future.

When interpreting these sentences we presumably at once try to relate them to

(10) (a) Alice warned Betty: "I am in a filthy mood."
(b) Alice warned Betty: "You are doing a dangerous thing."
(c) Alice warned Betty: "Charlie has promised to divorce you."
(d) Alice warned Betty: "You should be more careful in the future."

For (9a), 10a) is a plausible interpretation because people know more about their own moods than about those of others. For (9b) and (9c), (10b) and (10c) are plausible interpretations because it is natural to assume that Alice warns Betty about things that will happen to Betty rather than to herself. And for (9d), (10d) is plausible because people often give advice to others rather than to themselves. But it is possible to think of contexts

in which (9a-d) are plausibly interpreted with different assignments of antecedents:

(11) (a) Alice knew that when Betty was in a filthy mood, she was likely to do things she later regretted. Therefore Alice warned Betty: "You are in a filthy mood." She was hoping that Betty would go home at once.

(b) Alice knew that if she would get caught printing ten-pound notes, her sister Betty would be in trouble too. Therefore Alice warned Betty: "I am doing a dangerous thing."

(c) Alice knew that if she was divorced, her daughter Betty would lose the only home she had ever known. Therefore Alice warned Betty: "Charlie has promised to divorce me."

(d) Alice warned Betty: "I shall be more careful in the future." She wanted Betty to know that she would not let herself be cheated a second time, as she had been when Betty spent all the shopping money on candy.

The contexts in (11) add certain conditions which make it possible to refer the pronouns to antecedents different from those in the uncontextualized instances under (10). Again, we base our interpretations on a reconstruction of different possible worlds, choosing that possible world which best satisfies the conditions given in the context.

3.3. Next we should have an overall look at reporting verbs, to see to what extent a taxonomy of them offers clues as to the disambiguation of third-person pronouns in embedded clauses. To begin with, the question arises whether reporting verbs are a closed class at all. They can also be seen as an open category which can be extended, by metaphor if need be. Then, those reporting verbs which express verbal communication merge into a large class of other complementizing verbs that dominate embedded sentences but do not necessarily imply verbal communication (think, guess, and the like). Fortunately, even a very rough semantic classification into neutral verbs (say, think), verbs referring to modalities and relations between participants in a speech act (ask, inquire, request, answer, inform, tell, agree, disagree, accept, deny), verbs referring to memory (remember, forget), verbs referring to manner of communicating (speak, shout, yell, whisper, jot down, note down, write, wire, signal), verbs referring to understanding or epistemic certainty (understand, know, presume, guess, believe, assume), verbs referring to unreality (dream, imagine, fancy), and perhaps a few other categories suffices to show that pragmatic clues are particularly common with that category of reporting verbs which expresses

attitude: promise, regret, fear, assert, claim, acknowledge, admit, boast, threaten, warn; and also with the verbs that refer both to attitude and manner: laugh, smile, wave, wink, cry, sob (as in "Charlie left me yesterday," Mary sobbed.).

3.4. To disambiguate pronominal reference, we must thus look into the semantic relations and roles of the noun phrases connected with each reporting verb of the attitudinal category. Such analyses must consider not only the syntactic properties of these verbs, but also the conditions under which they can be felicitously used. Thus information such as the following should go into the lexical specifications of these verbs:

To warn takes three noun phrases: one indicating the person who warns, another indicating the person who is being warned, and a third indicating what the warning is about (A warns B of C). Warn is used felicitously if it implies that C is a matter of negative consequences to B ("if C, then B is in trouble"),and that A either wants to help B by informing him about the risk he is running if he does C, or wants to discourage B from doing C for other reasons.

To boast takes three noun phrases: one indicating the person who boasts, another indicating the person who receives the boast, and a third indicating what the boasting is about (A boasts to B about C). Boast is used felicitously only if the action or achievement expressed through C has come about by some action or interest of A's which A regards as having a strongly positive value in the relevant universe of discourse.

Such felicity conditions imply very definite pragmatic relations between constituents of the sentence. The receiver's strategy of interpretation is to reconstruct such relations, starting out from his knowledge of the felicity conditions which are part of the semantic specification of the verbs in question. If the structure is ambiguous, the interpreter chooses the one which is most plausible in the universe of that particular discourse. A person who knows that universe may interpret a sentence differently from a person who does not. For instance, a person who knows that Alfred has taught Bert everything he, Bert, knows, may interpret sentences (8a) and (8b) differently from a person who has never heard of Alfred or Bert.

4. Concluding remark

"The best meaning", said Martin Joos in discussing what some linguists have called 'Joos's Law', "is the least meaning." When we decode a text, we choose that interpretation which involves maximal redundancy: we select those meanings that are most likely and least surprising in the relevant context, situation and universe of discourse. Clues for this selection of meanings can be accumulated from different levels: the phonetic, the phonemic, the morphological, the syntactic, the lexical, and the stylistic. In the present frame of reference, what interests us is not, however, merely that Joos's Law is valid. The above examples have shown that when we try to disambiguate third-person-pronoun references in reported speech, we are often compelled to fall back upon a matching of felicity conditions of reporting verbs with our knowledge of the pragmatics reflected in the text. There is, in other words, a ceiling to how far we can capture pragmatic meanings through formal syntactic rules alone. In interpreting linguistic messages, we make good use of our knowledge of the ways in which language reflects the world.

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EPILOGUE

Alice began to get rather sleepy,
and went on saying to herself, in a dreamy sort of way,
'Do cats eat bats? Do cats eat bats?'
and sometimes,
'Do bats eat cats?'
for, you see, as she couldn't answer either question,
it didn't much matter which way she put it.

- L. Carroll.